THE BRICKBVILDER
AN ARCHITECTVRAL MONTHLY

VOLVME XXII MAY 1913 NVMBER 5

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CHURCH OF PORTA PANHAGIA,
THESSALY, GREECE

Thirteenth Century. Unusually wide joints. Brick in panels and symbolic designs.

THE BRICKBVILDER

MAY, 1913

VOLVME XXII. NVMBER 5.

Some Suggestions as to the Making of Working Drawings.

BY H. VAN BUREN MAGONIGLE.

THE practice of building has become so complicated that the working drawing is of vastly more importance than it used to be. Moreover, more and more, owing to the complexity and magnitude of present-day building operations, the architect is forced out of the old intimate contact with the work he had in earlier times — a general plan with a few important dimensions, elevations and section of a summary character, and the rest of the time spent on the job itself, laying out the work, making templates or drawing profiles on the stone. Plumbing, heating, ventilating, refrigerating or electrical installations were unknown.

Even within the present writer's experience, it was the custom to make a set of working drawings on cloth-backed Whatman or eggshell, inked in with black ink ground in a china saucer, and colored — crimson lake for brick, yellow ochre or lemon yellow for wood, prussian blue for stone. One copy of these was made on cloth and given to the contractor — I cannot remember a blue print in that first office nor, until a couple of years later, in another. And the typewriter not having been invented, all specifications were written and copied in long-hand. Droll legends of one's infancy.

But the invention of sun printing effected a revolution in the whole physical process. The tracing-cloth or paper drawing has come to to be the original drawing. And this article is to describe some of these physical processes as they are managed in the writer's office. After a pretty long experience in a number of offices, as well as in my own, I have arrived at some definite conclusions and state them for what they may be worth.

To many architects the word "system" is anathema; most offices are run without it; and it is a common experience that elaborate systems go to pieces on the rock of temperament. The moment any system is burdensome or troublesome or costs more to maintain than the labor it is supposed to save, it is time to dispense with that system, or to modify it. The object of any system is to increase efficiency, to save time, money, and annoyance. When a drawing is lost it loses time, which costs money, and both breed annoyance. And so I have gradually evolved a system of making and filing drawings which works satisfactorily and discounts temperament as far as I have found it possible to reckon with that element.

The first point to consider is not what goes on the drawing, but what is to be done with it after it is made. How is it to be filed for daily reference? How is it to be instantly found? How, when the job is done, is it to be filed? How, when so filed, is one to lay hands on it at once?

The answers to these questions I find in the following procedure:

First. All drawings, small- and large-scale and full sizes, are made on sheets uniform in size for each job.

Second. All cloth originals as soon as printed, and the office set of prints, are bound up in numerical order in a binder consisting of two maple slats with three brass thumb-screws. The slats are notched at the ends and the notches rest on two gas-pipe bars running lengthwise of the filing closet. The job number and name is on a label on the outer end of the binder. Hence, the drawing is bound in a set in numerical order, and cannot be lost, and the set itself has its own numerical order on the rack.

Third and Fourth. When the job is completed, the drawings for that job are merely transferred to an upper rack, out of the way for the present but precisely as accessible fifty years hence.

This is the best and most compact method of filing drawings I have yet discovered. It is the practice in many offices to roll old drawings up and store them in tin or cardboard tubes. This wastes a great deal of room and makes the drawings hard to handle after they have been rolled up for a year or more. In theory I never permit a drawing to be rolled up and put away; in practice it sometimes happens.

And I prefer this way to the "clothes dryer" system, among other reasons because a clear space equal to the depth of the drying rack must be maintained so that the racks may be pulled out, and this again wastes room, besides that wasted in the rack itself.

I have eliminated drawers for filing, or keeping drawings in, except for cloth and paper originals of general drawings while they are being worked upon. As soon as the prints are issued to bidders, the originals are taken out of the drawer, bound up and put in the rack to wait till the cuts begin.

When the contract is signed there is always one office copy printed, usually on cloth, and the draftsmen use this set for reference. Behind each man, in his alcove, are two hooks placed so as to take the notches at the ends of the binders, and the office set of the job he is in charge of is hung on these hooks every morning and put away in a fireproof vault every night. They are thus available for reference for other men working on the same job and are where the man in charge may be consulted most readily. They are also kept off of the tables which are left free for

work. The old way is to take an individual drawing out of a drawer and leave it kicking around in the way indefinitely. I have seen a mound of such drawings on a draftsman's table, with the drawing some one else needed at the bottom of the heap.

When drawings are kept loose in a drawer, the last drawing put away is put on top and the process repeated until they are all thoroughly shuffled and no one knows where any one of them is. They also slip down behind — familiar phrase.

Another point in favor of binding current drawings in a set is, that frequently more than one drawing has to be referred to, to settle some given point, and the advantage of having them all together is obvious.

So much for what happens to them after they are made. But in order to get the full benefit of this very simple system the drawings must be made uniform in size for each job. This is done very simply. It is easy to determine from the sketches, by a very little pains and forethought, the size the largest general drawing should be, and this establishes the size for the set. I have found it to work out that the sheet space required for scale and full size details is in a very direct ratio to the size of a building at quarter scale. For small buildings, such as small country houses, two or more plans and elevations can go on a sheet and thus establish a size that will be adequate for the large scales and full sizes.

The size of the sheet being established, the size is laid out on manila, with border line, cut-off line, binding space and spaces for titles; these are traced by a junior draftsman on sheets of cloth or tough bond paper, the manila sheet always being traced from to ensure accuracy. Whenever possible one dimension of a sheet is made that of a standard width of tracing cloth (30, 36, 42 or 48 inches) with the selvage torn off, to avoid wastage. A number of these sheets (similar to the two illustrations) are always kept on hand so that when a man starts a drawing he has only to go to the drawer and get one.

The small blocks of lettering in the bottom margin, and for a large job the main title as well, are printed in the office from zinc cuts in printer's ink, on a simple but ingenious frame (devised by Mr. Frank M. Snyder, who is responsible for many of the methods I use). This not only ensures uniformity and a ship-shape appearance to each sheet, but saves a stupendous amount of time in the course of a year in general lettering.

As to what goes inside the border lines and how it is put there, it is of course very simple as regards general drawings at quarter scale. The principal plan and elevation are made on stretched paper and the other plans, elevations and sections worked over them on tough bond paper and are not traced till they are nearly complete with everything essential shown. It is folly to rush drawings on to the cloth too soon. Changes are bound to be made which are tiresome and expensive to make on cloth. It pays to hold off until the chief is about through changing his mind. And when they are traced, they are traced in diluted ink, the thicknesses of lines being varied to bring out salient facts or keep subordinate facts in their proper subordinate relation; diluted ink is almost as easy to rub out as pencil. All notes and lettering, piping and steel, in plan, etc., and a silhouette representing the plaster thickness are drawn in pure black ink, but not until everything is supposed to be settled; this black line on the cloth and the corresponding strong white line on the print clears up a plan or section and makes it easily read.

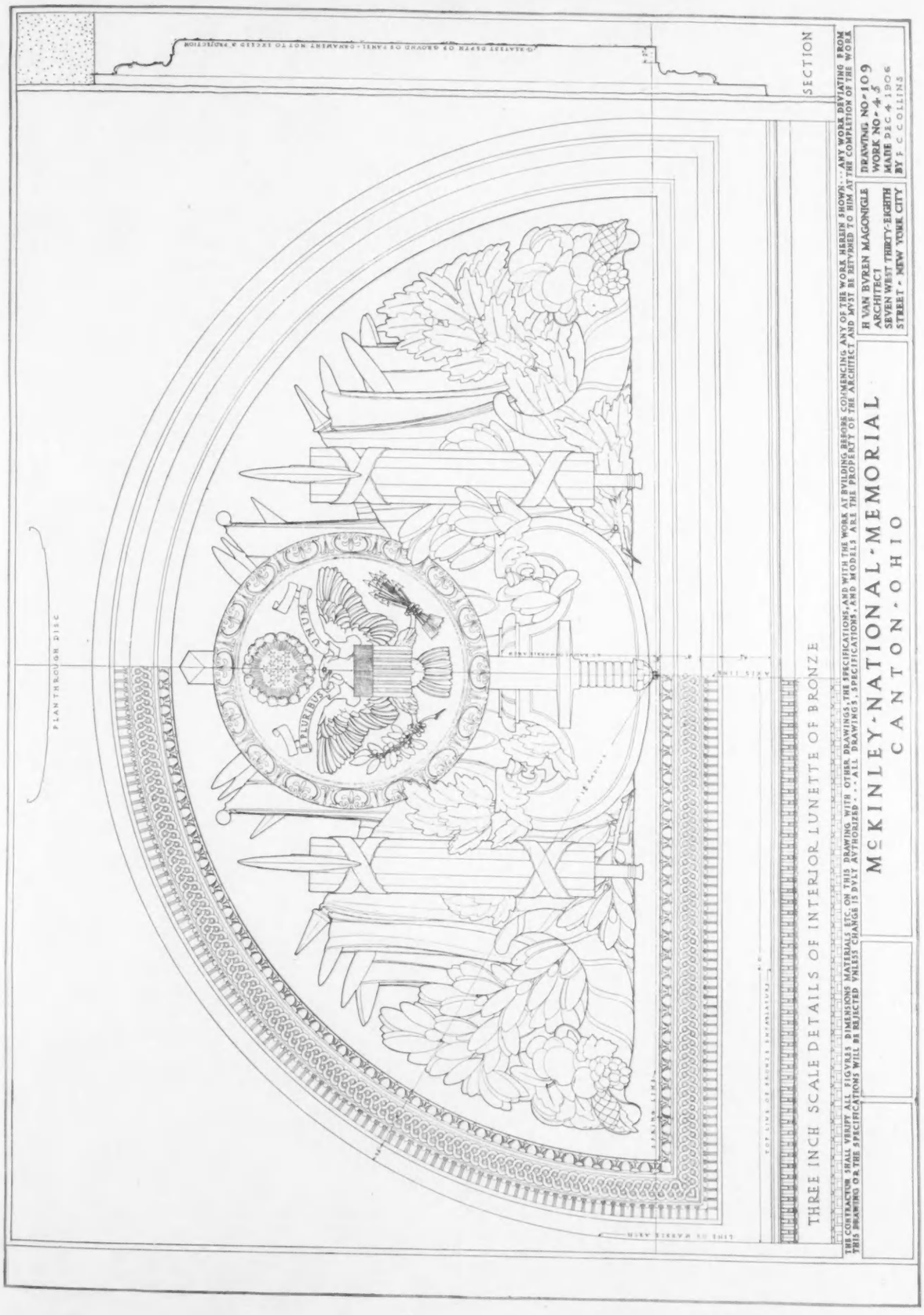
The indication of material in plan or section is always drawn in a thinner line than, for instance, the lines indicating the wall itself. Originally, we used two grades of diluted ink; but we find that the variation in the thickness of the line gives the difference in value and makes a better print, especially for black or cloth prints. It is well to have the ink pretty dark, for the lines always get worn off a bit on a large drawing, and they lose something when the dirt and pencil marks are washed off with gasoline — a far better way to clean cloth tracings than with a rubber.

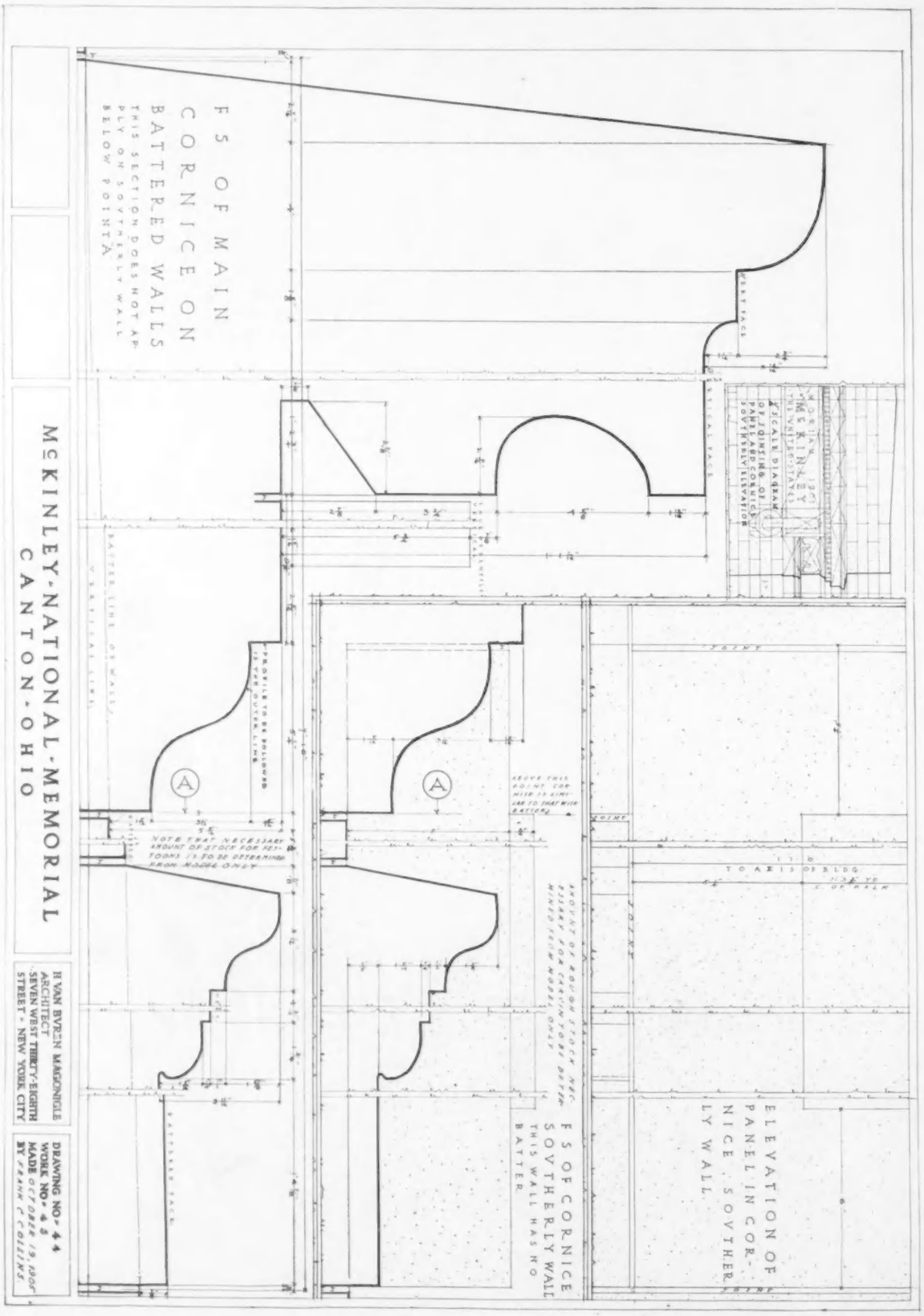
It used to be the custom in my office to run a wash over interior partitions, using alcohol instead of water to avoid puckering and shrinking the cloth. This has to be done carefully and run pretty dry and even then it blisters slightly. Recently we have been using yellow pencil, which prints very well, avoids shrinkage, is easily rubbed out and leaves no mark. It is far from handsome on the cloth, but looks perfectly well on the print. And just here I would emphasize the importance of that. It must be remembered that the print is what the contractor gets and what the building is built by; so that at every step in the process of making the cloth original, one must bear in mind the effect on the print.

In the case of large scale drawings, these are usually studied on tracing paper, and almost always the various parts such as plans or sections to explain a detail elevation are made on separate pieces of tracing paper, it being much quicker and easier to study them in this way. They are then assembled on a standard sheet in an orderly and readable manner. I find this takes less time and the final result is clearer — for it is difficult to plan out the sheet when the drawing is begun on the final cloth or paper so that everything will fall into a proper relation. And it is possible to condense the final drawing materially without losing clearness, and give the builder only what he needs. For purposes of study it is essential of course to draw out a doorway or window, for example, complete. But the builder only needs half of it. It is studied in full on tracing paper, and only half of it traced for him.

A good working drawing of any kind is that one which gives the builder all that he needs — no more and no less. And an immense amount of paper, time, and money is wasted every day in this one particular. The ideal drawing is one which is so condensed, yet so clear and readable that it is only necessary to hand it over to the contractor and tell him to build it. If it is a perfect drawing he should not have to ask one question; especially if explanatory notes are copious and really explain. I like to be able to look at a drawing either in the office or in the field and find everything I want to know on it without the necessity of referring to the specifications; I will go so far as to say that the chief uses of specifications are, to enable the bidders to submit a figure before the detail drawings are begun, as a subsequent guide to the draftsman who must know what has been contracted for, and that the contractor may order certain materials in bulk, such as brick and plaster, beforehand. But beyond this the drawings should render reference to the specifications unnecessary.

Very much of what has been said about large scale


SECTION
PLAN THROUGH DISC
E PLURIBUS UNUM
THREE INCH SCALE DETAILS OF INTERIOR LUNETTE OF BRONZE
THE CONTRACTOR SHALL VERIFY ALL FIGURES DIMENSIONS MATERIALS ETC. ON THIS DRAWING WITH OTHER DRAWINGS, THE SPECIFICATIONS, AND WITH THE WORK AT BUILDING BEFORE COMMENCING ANY OF THE WORK HEREIN SHOWN. - ANY WORK DEVIATING FROM THIS DRAWING OR THE SPECIFICATIONS WILL BE REJECTED UNLESS CHANGE IS DULY AUTHORIZED. - - ALL DRAWINGS, SPECIFICATIONS, AND MODELS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED TO HIM AT THE COMPLETION OF THE WORK
H VAN BUREN MAGONIGLE
ARCHITECT
SEVEN WEST THIRTY-EIGHTH
STREET - NEW YORK CITY
DRAWING NO-109
WORK NO-43
MADE DEC 4 1906
BY F C COLLINS
McKINLEY-NATIONAL-MEMORIAL
CANTON-OHIO


F S OF MAIN CORNICE ON BATTERED WALLS
THIS SECTION DOES NOT APPLY ON SOUTHERLY WALL BELOW POINT A
ELEVATION OF PANEL IN CORNICE, SOUTHERLY WALL
F S OF CORNICE SOUTHERLY WALL
THIS WALL HAS NO BATTER
NOTE THAT NECESSARY AMOUNT OF STOCK FOR RETURNS IS TO BE OBTAINED FROM MODEL ONLY
McKINLEY-NATIONAL-MEMORIAL
CANTON-OHIO
H VAN BUREN MAGONIGLE
ARCHITECT
SEVEN WEST THIRTY-EIGHTH STREET - NEW YORK CITY
DRAWING NO. 44
WORK NO. 48
MADE OCTOBER 19, 1901
BY FRANK C. COLLINS.

drawings applies to full size details. In fact, more time and paper are wasted on full sizes than for any other class of drawings. In my office, full sizes of a large cornice, let us say, are roughed out in full on manila for purposes of study. When completely studied it is broken up, large plain surfaces such as fascias and large projections reduced and the correct dimensions figured. Bearing in mind that the drawing will be printed and will therefore shrink, it is essential to figure it completely — but since this should be done anyway it is no extra labor. The illustration shows a full size detail of a cornice, 7 feet 10 inches high, condensed for the builder on a sheet 29 x 42 inches, and far easier to handle and work from than if shown *in extenso*.

Usually full size details are carried on simultaneously with the scale details, so that the ¾-inch scale drawings agree absolutely with the full sizes. There are many cases where it is essential to rough out full sizes to see that some corner works out properly, and I prefer to carry this principle out fully. Working back from the full size to ¾-inch scale has the further advantage of assuring one that he is getting things in scale. And by the time the ¾-inch scale detail is done the full sizes are ready to assemble and give out.

Of course all this doesn't do for those offices where all general drawings are made by one set of men, all scale details by another, and all full sizes by a third. I am addressing artists, not manufacturers.

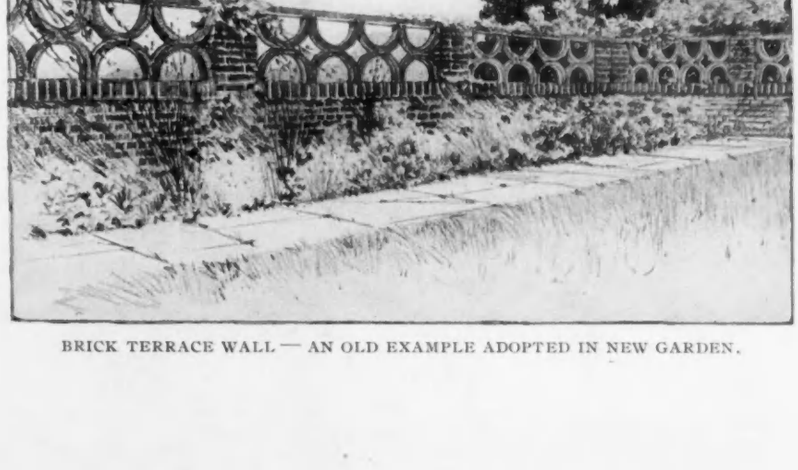
Another practice I have found convenient is to make most drawings of ornament at one-quarter full size, especially if it is a large composition. To illustrate I give the inner lunette of a bronze doorway, which is 12 feet across. It would have been out of the question to draw it in full size and entirely unnecessary. At three inches to the foot the drawing can be scaled to a very small fraction of an inch. I know that it is not considered essential in many offices to study ornamental detail so carefully; a small rough sketch, a note "ornament here," and the modeler does the rest. I have tried that method — that is why I never did it but once.

There are two pitfalls to guard against in this method of working. One is that some men are prone to go too far in their tracing paper studies and finish them up to too great an extent and then trace them all over again on the final sheet; at least a third and often half of the drawing can be done once and for all on the final. The other is that some men miss the point about condensation and condense to such an extent that the devil himself wouldn't know what the drawing represented and how the parts fit together.

There are a few maxims current in my office that help to keep things straight; they are:

1. Be thorough.
2. Take nothing for granted; look it up.
3. When in doubt don't leave out anything; too much information is better than not enough.
4. Every drawing must be finished complete before it leaves the office.
5. It takes less time to do a thing right in the first place than to correct mistakes.
6. A working drawing is not a picture.
7. Don't be sloppy.
8. Use your head.

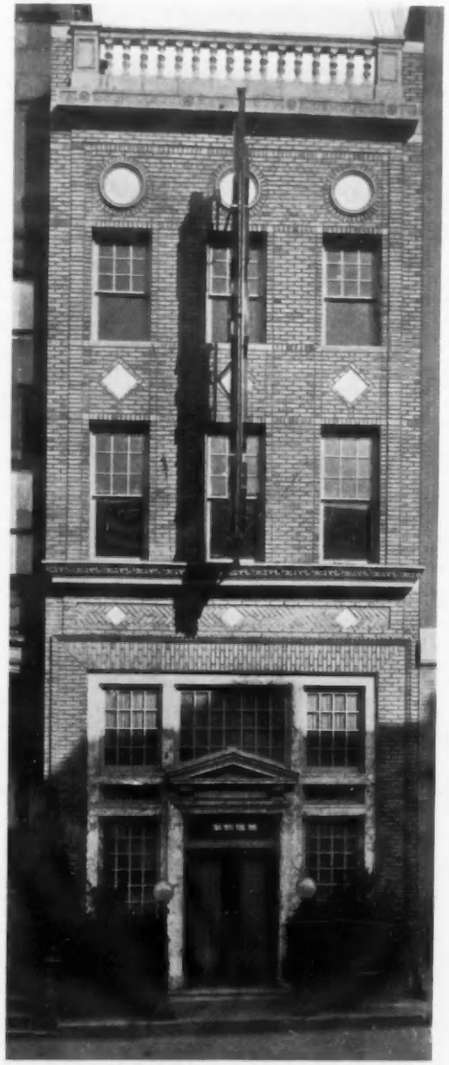
And in this last is the whole secret.



BRICK TERRACE WALL — AN OLD EXAMPLE ADOPTED IN NEW GARDEN.

STORE—PHILADELPHIA, PA.
ARCHITECT NOT KNOWN

STORE BUILDING—PHILADELPHIA, PA.
CHAS. BARTON KEEN, ARCHITECT



RESTAURANT—NEW YORK CITY
WALTER D. BLAIR, ARCHITECT

STORE FAÇADE—WASHINGTON, D. C.
UNGLAZED TILE ON CEMENT. ARCHITECT NOT KNOWN

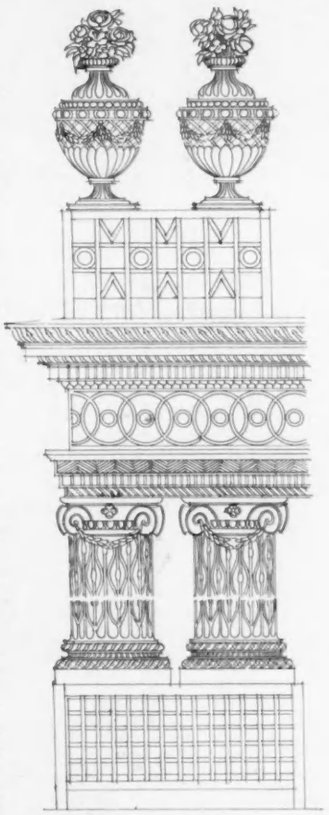
LUNCH ROOM—ALBANY, N. Y.
GLAZED TILE ON EXTERIOR ARCHITECT NOT KNOWN

GROUP OF SMALL MERCANTILE BUILDINGS

Lattice—Its Use as an Architectural Embellishment.—Part I.

BY GEORGE S. CHAPPELL.

WE are returning to the country. The snug city-dweller no longer points the finger of scorn at Mr. Suburbanite, bundle-laden. The newspaper humorist and magazine wit less and less often shoots his darts at the painful joys of grass-cutting, snow-shoveling and other bucolic pastimes. He probably lives in some green-embowered village himself and gets up early these spring mornings to see if the sweet peas have sprouted yet. Lettuce leaves are of deadly import to him and ambition germinates with the growing garden. The proud proprietor of the one-bath-power bungalow will some day graduate into the twelve-room-two-bath-parquet-floor-thirty-minutes-from-Broadway dwelling with lawn in front, vegetables at the back, and a whirligig to hang the clothes on, while the former owner of such magnificences flies farther afield, chug-chugging in his miniature motor three or four miles to the station which is nearest his real farm! Back to the land! is the cry of the younger generations. Thus we have come to take an interest in gardens and their products. We pass beyond the simple axiomatic knowledge conveyed by that priceless volume and first aid to naturalists, "How to Tell the Birds from the Wild Flowers." We actually grow things, and boast about them and match cabbage-heads with our neighbors.

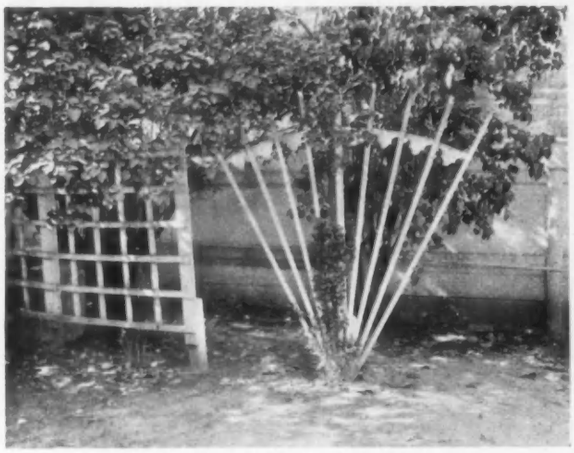


"The round column becomes a wicker basket—"

This turning of the present generation to green fields and pastures both new and old has resulted in a remarkable renaissance in the country architecture of America. Happily too, as the life has been more real and answered to a distinct economic impulse the result in design has been both happy and interesting. It is the connection with this big wave impulse that I should like at the outset to emphasize in this article. The observation of any particular detail of a general scheme can never be possessed of the slightest interest unless it is carefully and logically correlated to the great whole of which it is a part. So with the subject of lattice and garden furniture, the charm of such an out-of-door field for speculation and discussion should never lead us into the pernicious habit of forgetting the real object of these delightful adjuncts to country house design.

We have been misled from the start. One has only to turn the pages of Schoy's *Epoque Louis XVI* to see to what extreme ends cleverness may be carried by a mistaken basic idea as to the functions of a method and a material. In the illustrated annuals of this period of highly developed artificiality how clearly are reflected the unreasoning quest of pleasure, the half rational, half freakish outbursts of spoiled children always hungering for a new toy. The classic outlines of the garden pavilions so popular in the latter eighteenth century underwent little or no change in their translation from stone to the delicate Fracerr of "Treillage." In this lamentable lack of imagination we see the mind wearied by excess, an artistic sensitiveness unaroused by any real need turning to the latticed arbor, not as a moral necessity but as one more adjunct to a life of gaiety and pleasure. The round column becomes a tall wicker basket, the more formal details of cornice and capital yield not at all to the particular expression of the new material. The total result seems to me to be one of elaborate hardness sadly lacking in originality. Formal architecture will always have its reason for being as long as it represents real formality of mental life, a logical spirit of mind and a reasonableness which is to-day and always has been distinctively characteristic of the Latin mind. It may be, therefore, that these sophisticated bouquets of the old court gardeners are of historical value and not without charm in the prim setting of Versailles and Compiègne. However, one can not but be thankful that the turn of American mind, in country architecture at least, has been away from the hard-and-fast rules which governed the great masters of the classic period.

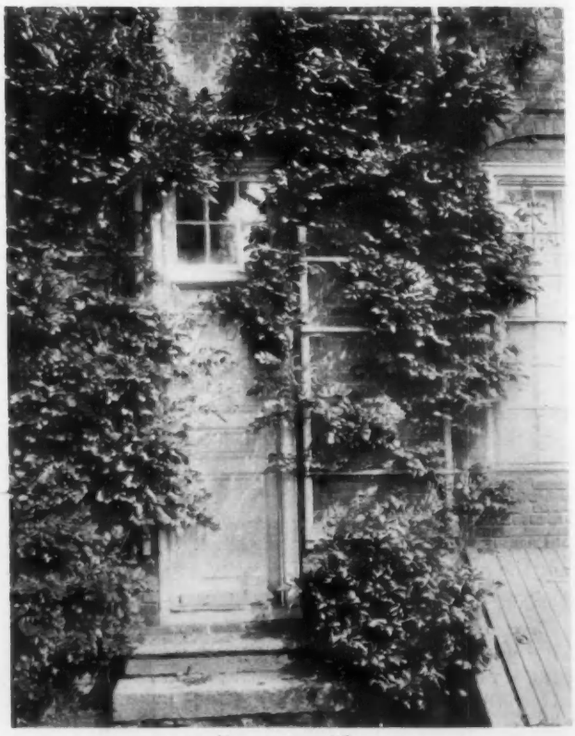
Nowhere, indeed, do we find the use of lattice developed with the simple directness and success which characterizes it in American country architecture from its earliest days. It was a need, not a luxury. The latticed porches and arbors of our New England forefathers touch the highwater mark in this particular branch of design, and, as with greater problems, seem to conform to the universal standards of simplicity and beauty. How true it is, the so obvious remark, that a material must be used suitably. Of nothing is this more true than of lattice, and yet how often we find it distorted and strained to express shapes and forms entirely foreign to its nature. In the beginning we have, if you please, a collection of small flat sticks and the simple problem to construct from them a support for vines. It was this plain need and these plain materials which were at the hand of the colonial carpenter. He went at the task with refreshing directness. One of the famous examples of the simplest kind of lattice work is the old Germantown house known as "Wyck." This old mansion was built in 1690. Two separate buildings between which passed a wagon-road were joined, making a single structure of unusual length. It is an interesting link with the past to know that the wagon-road itself followed the line of an original Indian trail, and surely nothing could be further removed from the savagery of Indians than the dim quiet of the old hallway to-day, with the spacious rooms on



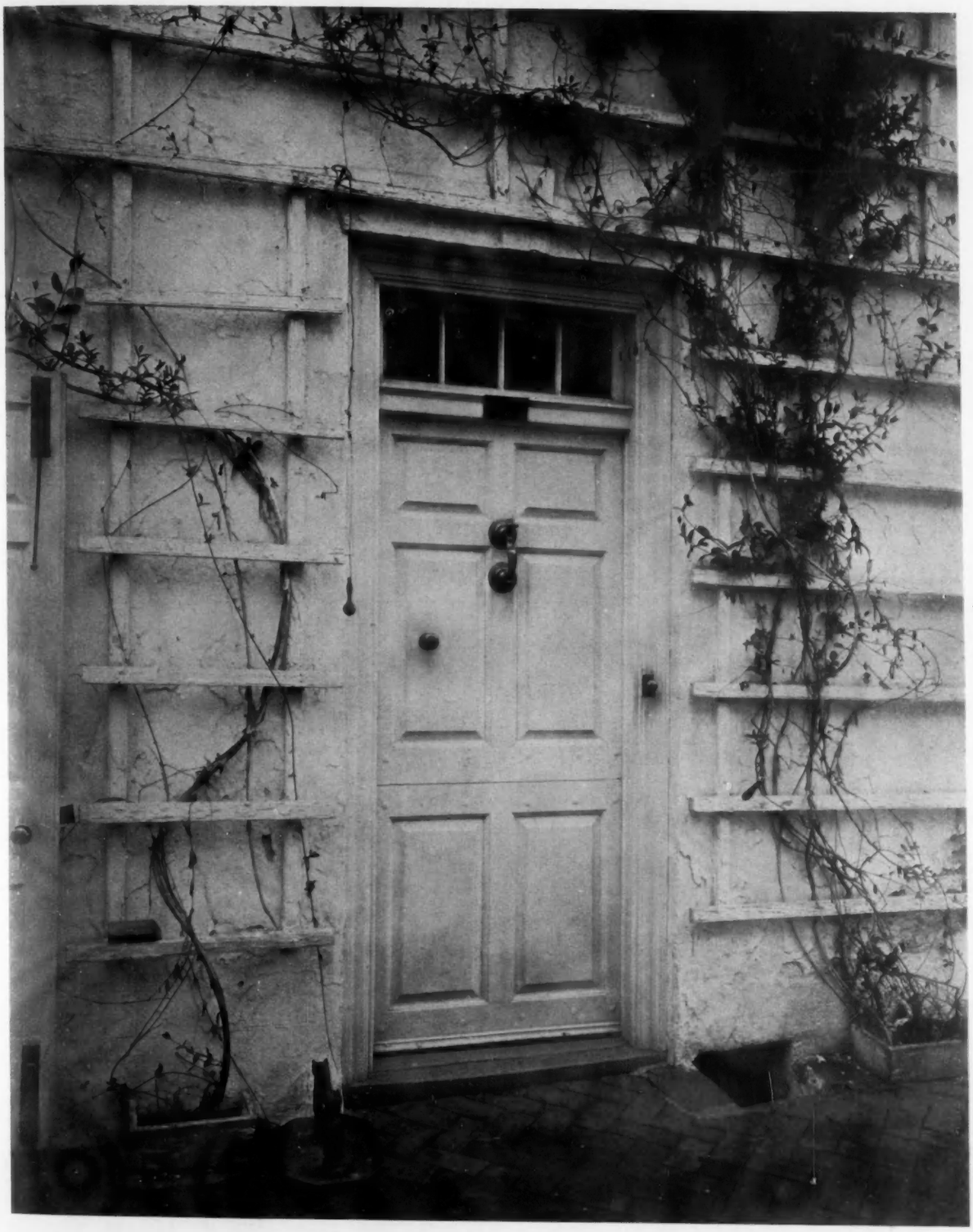
THE OSGOOD GARDEN, SALEM, MASS.

either side where the graceful shapes of Chippendale furniture and the dull luster of old silver voice the refinement of years of culture. Both long sides of the house are covered as to wall surfaces with ladder-like arrangements of lattice. It is lapped at all joints, the horizontal members projecting usually about four inches beyond the vertical supports. Here perhaps it would be well to say that almost invariably the early work is put together in the easiest way, that is, by simply crossing the pieces of material and nailing them at the joint. It is only in later and less honest work that one finds the habit growing to halve the joints and to build up a sort of grillage which is expensive to build and troublesome to maintain, as the close joint, exposed to the rigor of our changing seasons, almost invariably splits or opens. Yet the average carpenter will admire the halved joint because of the additional workmanship necessary. It is a pretty safe rule to follow in building — that the best way is the simplest and *vice versa*. The lapped joint touching at only one surface allows of an almost free passage of rain-water around the assembled parts. At Wyck the material used measures one by two inches and is laid the flat way. It is beaded at the edges and this has resulted in part of the charm of the treatment, for the woodwork, in common with the masonry back of it, has been so frequently whitewashed that a wonderful scale encrusts its surface, through which the fine line of beading counts with subtle delicacy. This result, as with that of the whitewashed texture, is undoubtedly entirely accidental, one of those happy results of time which are the despair of the designers of to-day, but does it not suggest that there may be some simpler method of finishing our lattice material, some less mechanical and smooth process than our regular mill finish? In the old Logan homestead "Stenton," which is also in Germantown, we find a treatment similar to Wyck with interesting variations and the same lovely simplicity. Here the horizontal members are considerably lighter than the vertical lines, and the whole effect is remarkably graceful contrasted with the solid masonry background and heavy masses of foliage. Attractive variations in the use of lattice are found in both early and later examples. Again, the best type of colonial work seems to come most near perfection in the innocent frankness with which various problems are solved, as for instance, in the two bits of detail shown of isolated vine and shrubbery supports from the wonderful old Osgood garden in Salem, Mass. Nothing could be more graceful than the fan-shaped design with the amusing links of scroll work which show that the designer was not wholly absorbed in the strictly utilitarian. In connection with porches alone we find a surprising variety in the early colonial work, frequently in the simple squares or diamonds, but often combined with flanking seats or ingeniously arranged to frame generous openings which serve as windows through the vines. In many instances the entire porch is of lattice with round or elliptical arched supports over which the rose and honeysuckle form the only roof.

It has remained for our architects of to-day to extend the field which the colonists hardly explored. Here of course lay the danger line. We have gone beyond the use of a combination of small flat pieces of wood for definite ends to the employment of such bits of carpentry as an inherent part of the design itself aside from their practical reason for being. Along formal lines this has been done with conspicuous success in the Gambrill house at Newport. Here the architects, Carrère and Hastings, frankly went to the old French models, which in this instance are peculiarly appropriate. The house itself and its dependencies, pergolas, arbors and wall-lattices, are formal and decorative. But such a purely decorative aim is infrequently so well carried out and the result is apt to look affected and illogical. A few years ago there was a craze for lattice decoration. Every country householder, every architect, every draftsman working on competition drawings cross-hatched every available bit of interior wall space with amazing gridirons, bare prison gates nailed against stucco and brickwork often at an altitude high enough to discourage even the most hardy vine. In my



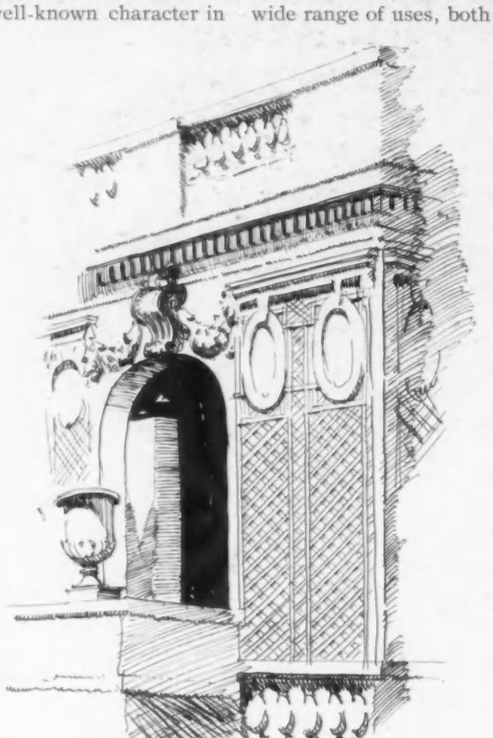
SOUTH DOOR OF "STENTON," GERMANTOWN, PA.



"WYCK" HOUSE, GERMANTOWN, PA.

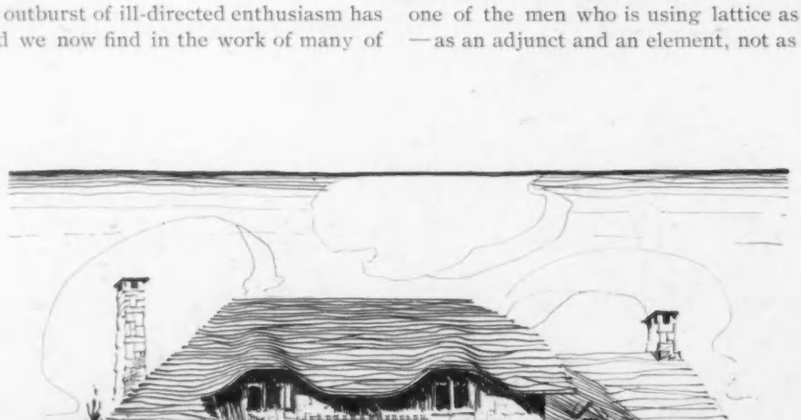
AN EXAMPLE OF THE SIMPLEST KIND OF LATTICE WORK. BUILT 1690

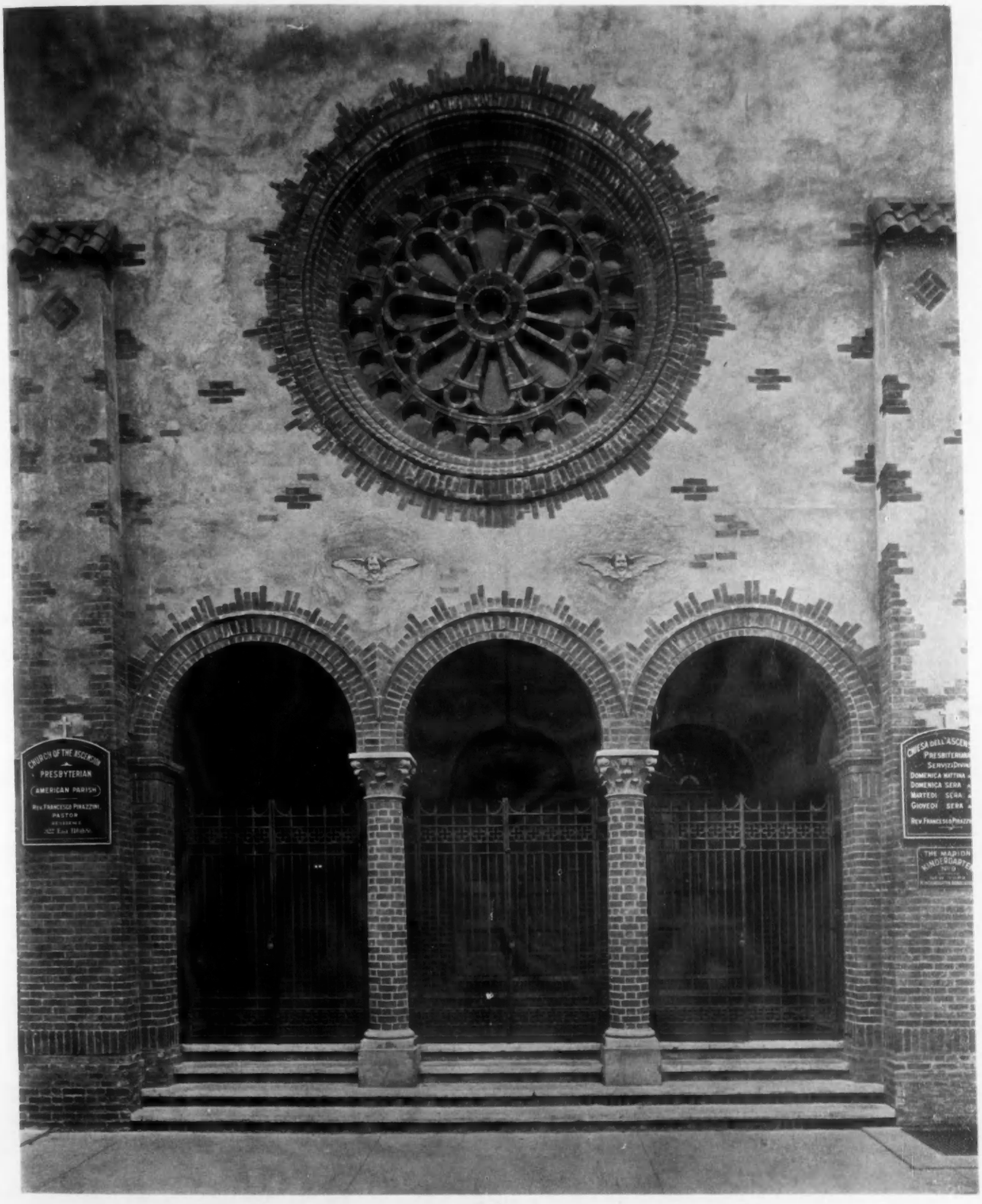
early youth I used to be shown, for my artistic education, oil paintings from the hand of a well-known character in my native New England town. She was the wife of an old sea captain and the lonely vigils of this patient Penelope turned to the artistic portrayal of polar scenes painted, naturally, entirely from data derived from winter-night descriptions furnished by her husband during his infrequent sojourns at home. They were rare visions of the Northland, glittering in all the bravery that powdered mica and gilt paper stars could bestow. But the crowning flight of fancy was in the icebergs, which were gorgeous towering affairs studded with most comfortable looking balconies upon which sat or reclined entire families of polar bears, like box parties at the opera. The sides of the bergs were sheer and smooth, indeed smoothness of finish was one of the old lady's canons of excellence in painting, and I could never gaze upon one of those cozy bear gatherings without wondering with all my young soul how in the world they all got up there and how in the world they would ever get down. So with these isolated barnyard gates flung upon the outer wall —the only reasonable explanation of their presence is a cyclone which may have plucked them from their natural surroundings and left them as a matter of record.



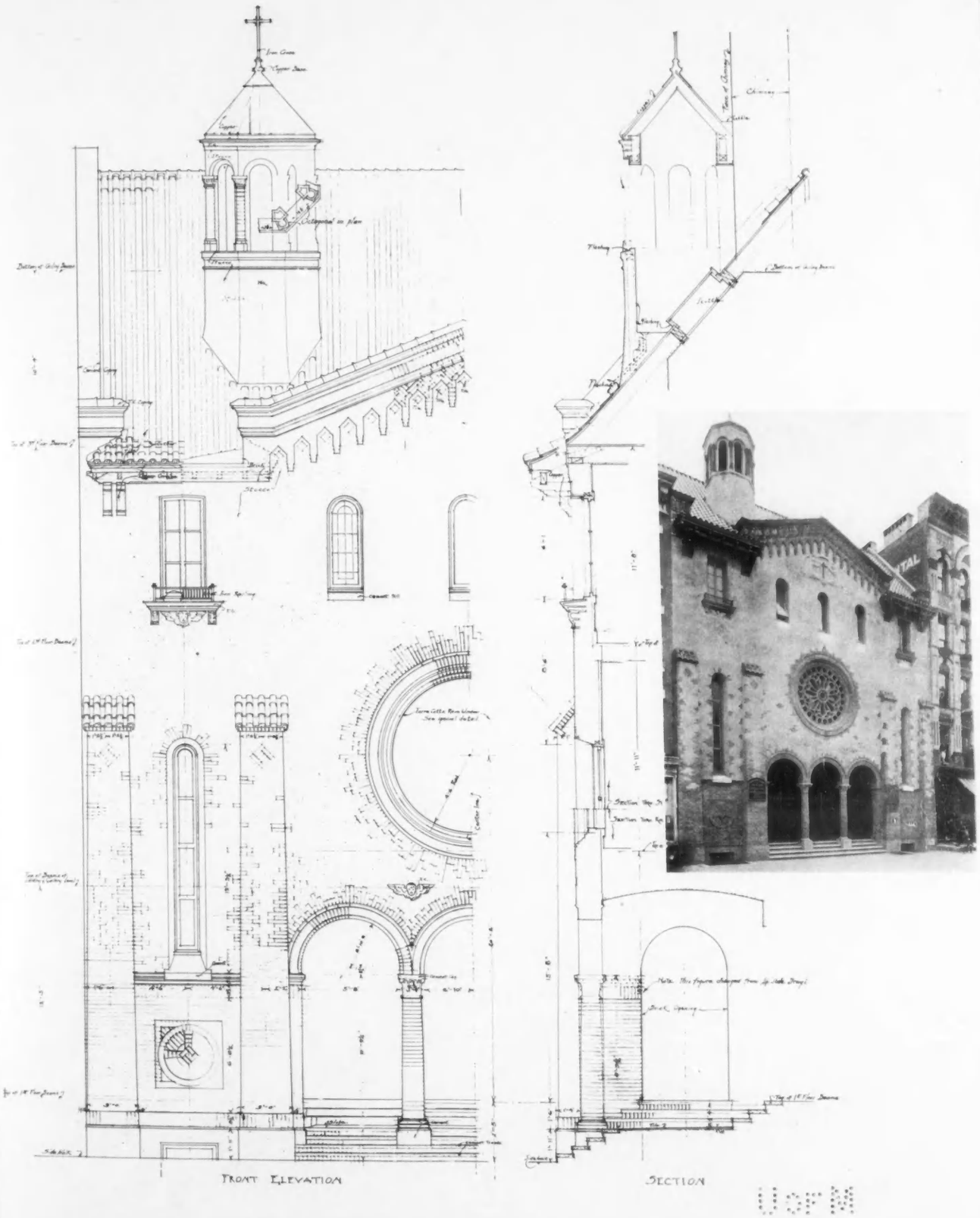
DETAIL OF GAMBRILL HOUSE, NEWPORT, R. I.
Carrère & Hastings, Architects.

Happily, the first outburst of ill-directed enthusiasm has been short-lived and we now find in the work of many of our younger men extremely attractive arrangements in a wide range of uses, both in the closer relations of porches, piazzas, sun-rooms, and laundry enclosures and the more detached designs of summer houses, arbors, and pergolas. I almost hesitate to mention pergolas, this poetic word has been so much taken in vain. The pergola disease was even more virulent than the lattice fever and even infected some of our best city buildings. Most of them have recovered but still show the scars in the shape of moldering beam ends projecting above some two hundred feet of masonry. If anything can be more depressing than the aspect of one of these city-bred pergolas during a February snow-storm I have yet to see it. After gazing at some of these aberrations it is refreshing to turn to the old colonial houses where the lattice was used because it was a real need, and to some of the work being done to-day along the same lines. If I might quote a single name as pre-eminently typical of great artistic sensitiveness in the modern uses of this graceful garden accompaniment, I should name Mr. Howard Shaw of Chicago, whose work in all departments of country house architecture has made him an authority never to be neglected. The forms employed by Mr. Shaw are almost invariably extremely simple ; the use he makes of them is uniformly exquisite and appropriate. He is one of the men who is using lattice as it should be used —as an adjunct and an element, not as an end in itself.





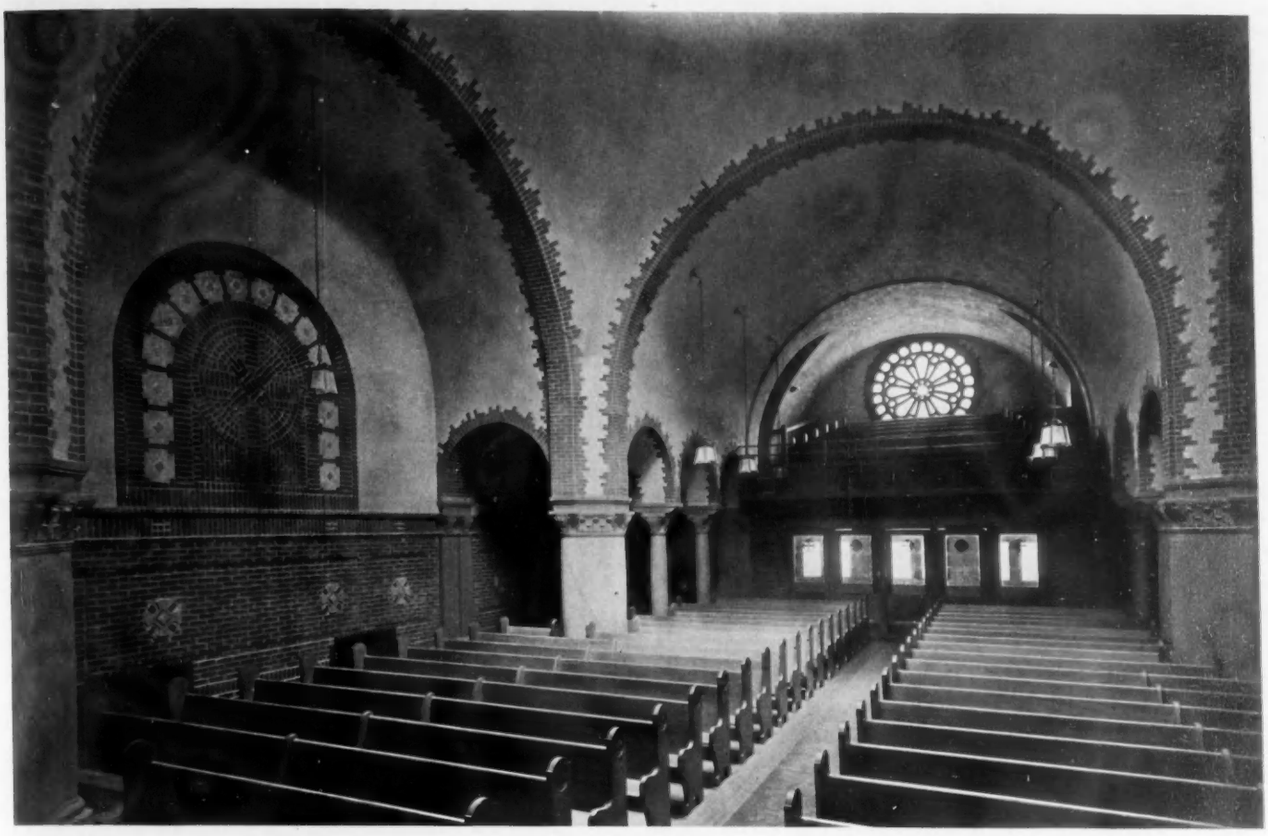
THE CHURCH OF THE ASCENSION, NEW YORK CITY
LUDLOW & PEABODY, ARCHITECTS

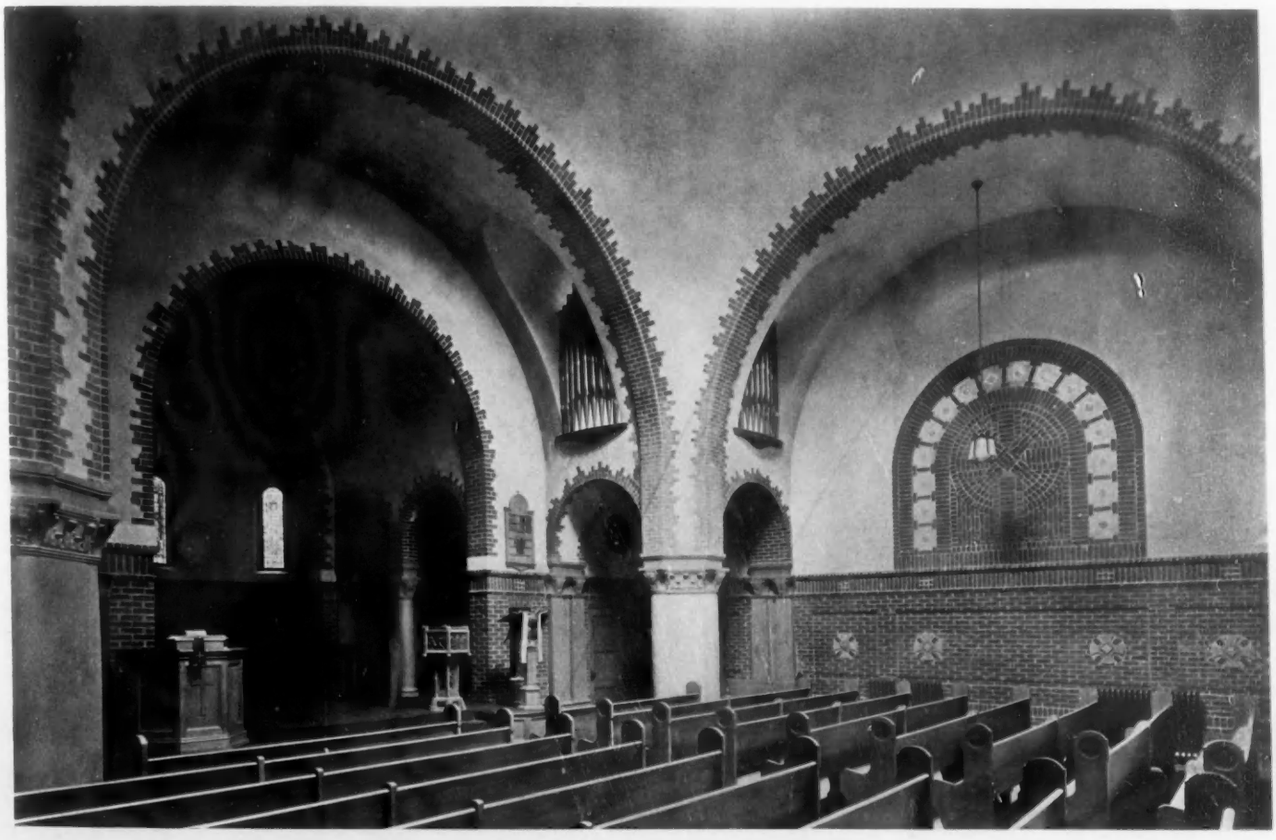


FRONT ELEVATION

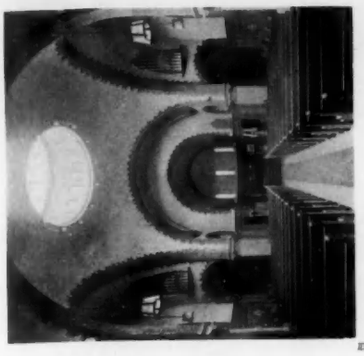
SECTION

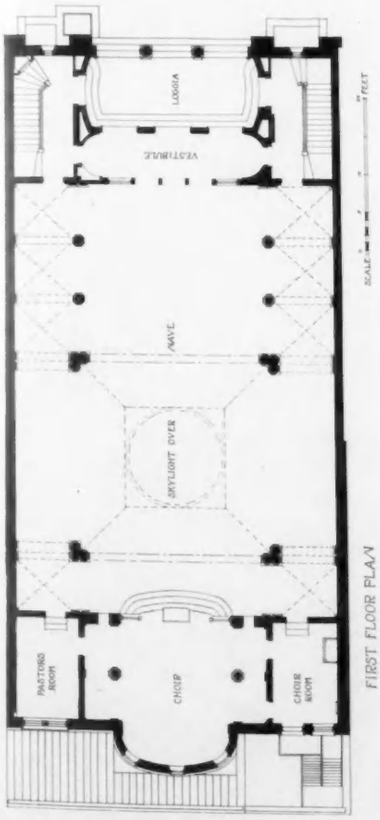
THE CHURCH OF THE ASCENSION, NEW YORK CITY
LUDLOW & PEABODY, ARCHITECTS





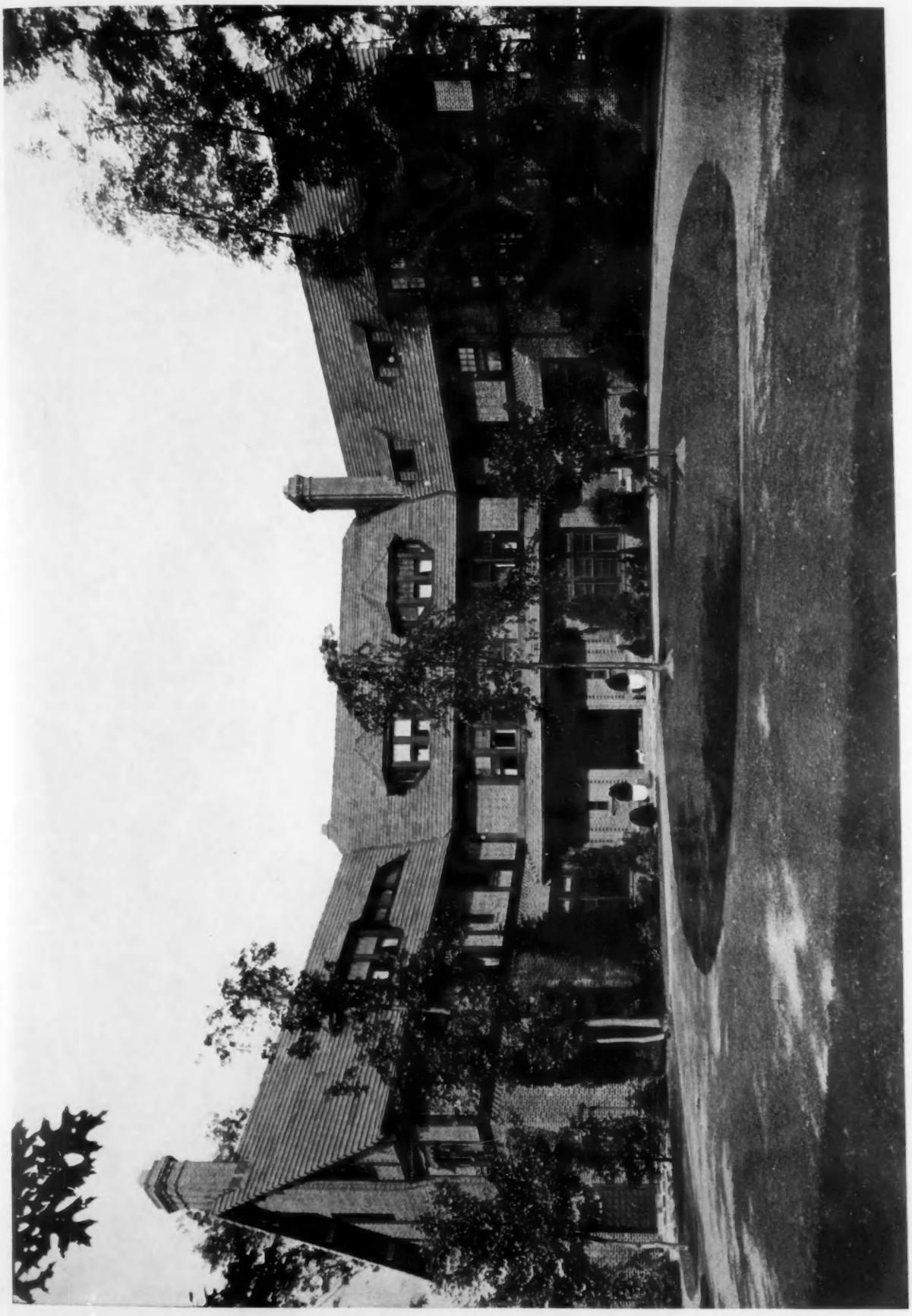
THE CHURCH OF THE ASCENSION, NEW YORK CITY
LUDLOW & PEABODY, ARCHITECTS





FIRST FLOOR PLAN

THE CHURCH OF THE ASCENSION, NEW YORK CITY
LUDLOW & PEABODY, ARCHITECTS



HOUSE AT COLD SPRING HARBOR, LONG ISLAND, N. Y.
GROSVENOR ATTERBURY, ARCHITECT

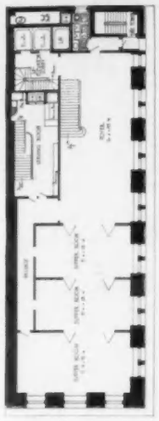
HOUSE AT COLD SPRING HARBOR, LONG ISLAND, N. Y.
GROSVENOR ATTERBURY, ARCHITECT

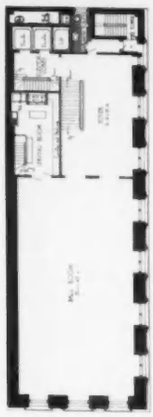
HOUSE AT COLD SPRING HARBOR,
LONG ISLAND, N. Y.

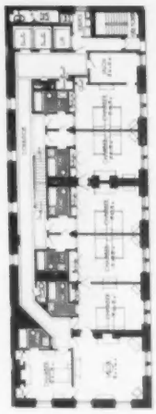
GROSVENOR ATTERBURY, ARCHITECT

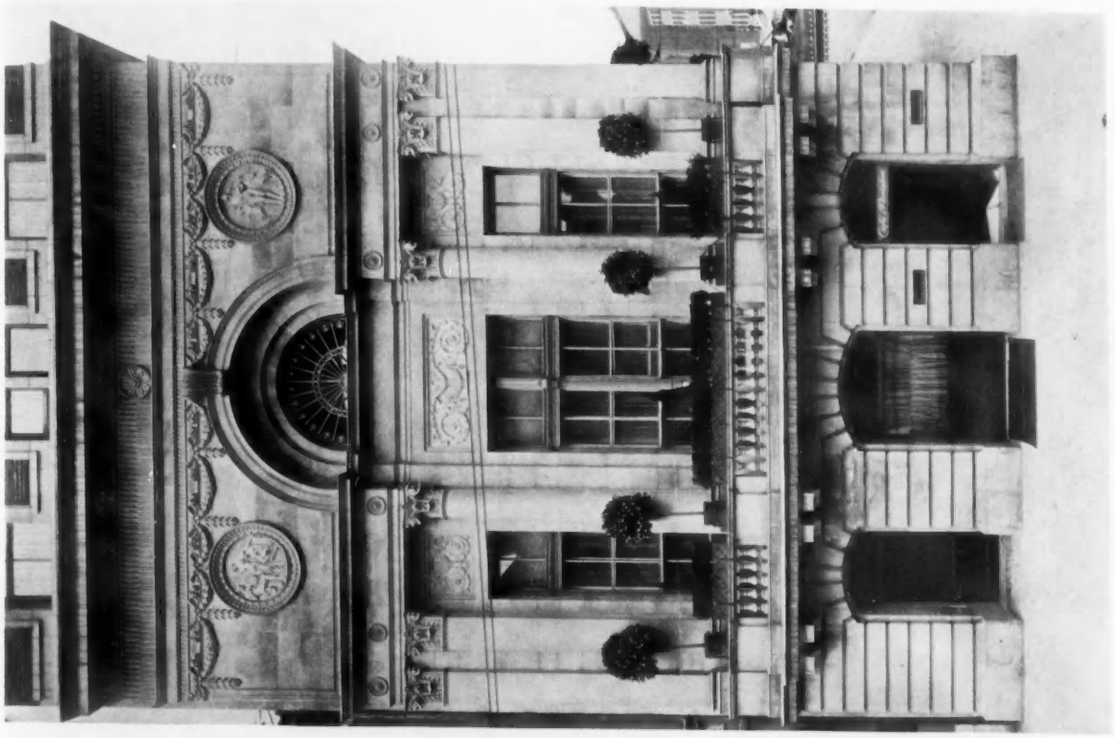
THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.

HORACE TRUMBAUER, } ASSOCIATE
WARREN & WETMORE. } ARCHITECTS



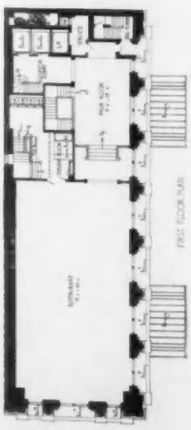


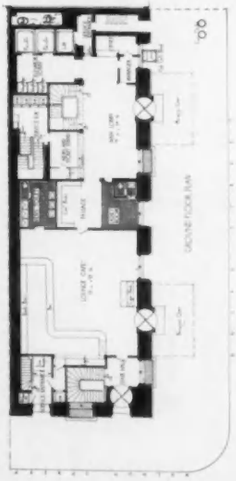


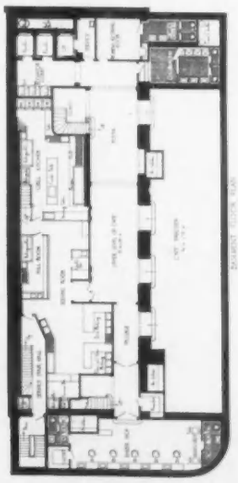


DETAIL WALNUT STREET ELEVATION

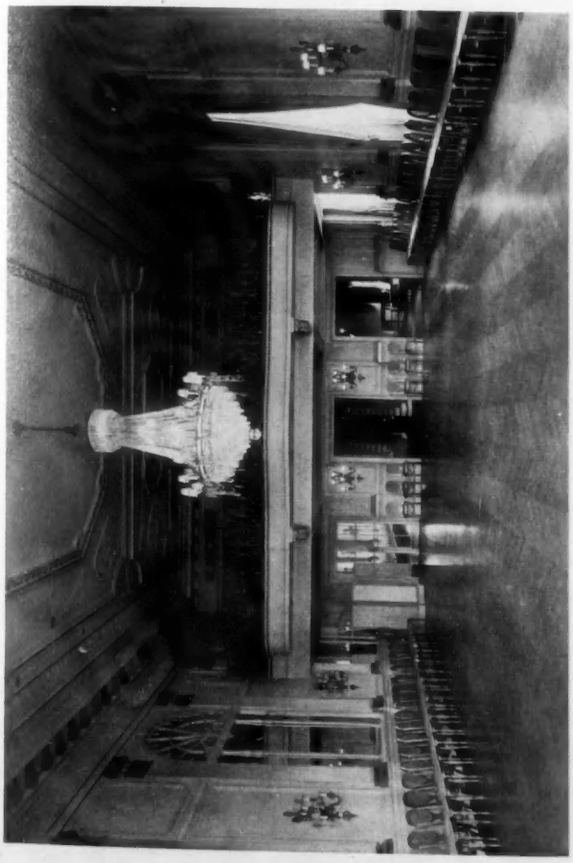
THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
HORACE TRUMBAUER, } ASSOCIATE
WARREN & WETMORE, } ARCHITECTS



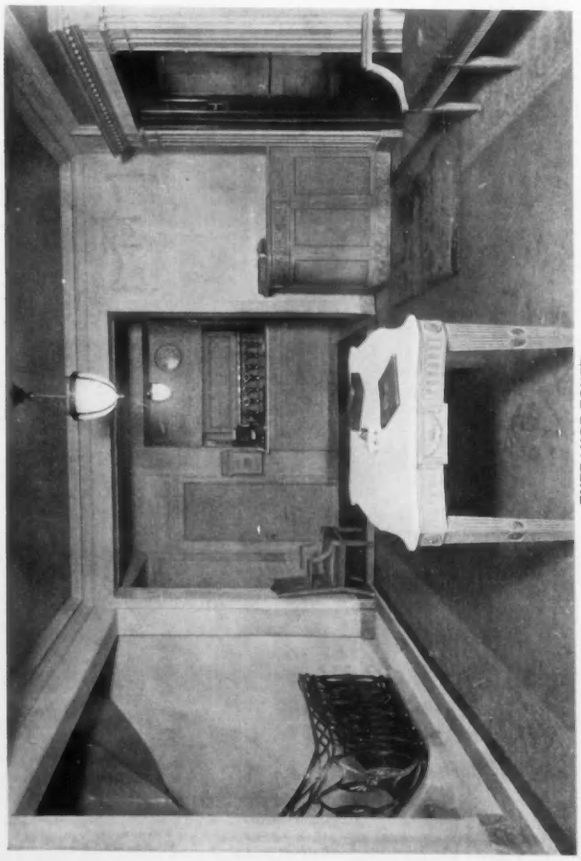




PALM ROOM



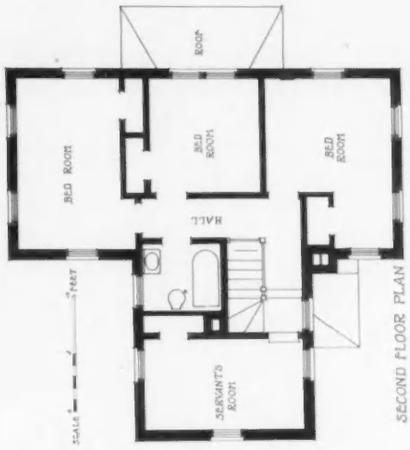
BALL ROOM



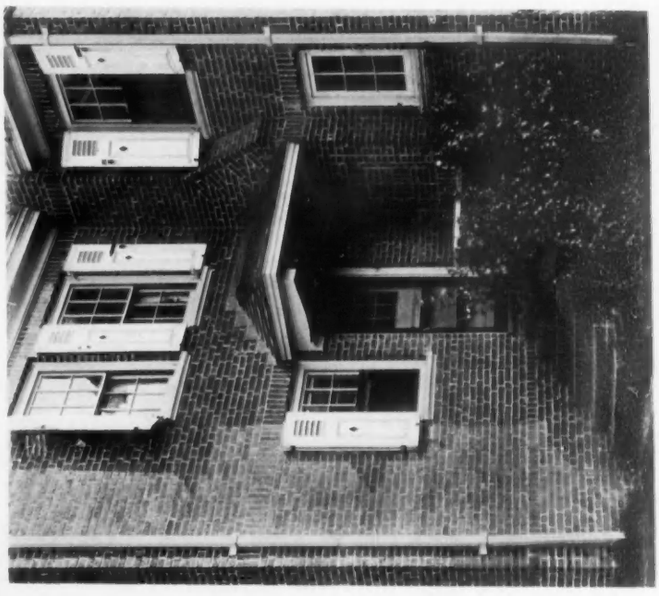
ENTRANCE FOYER

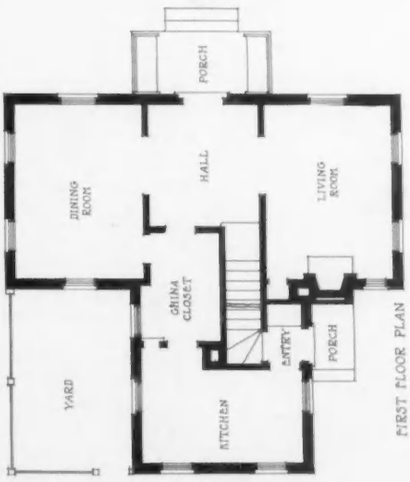
THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
HORACE TRUMBAUER, } ASSOCIATE
WARREN & WETMORE, } ARCHITECTS

THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
HORACE TRUMBAUER, } ASSOCIATE
WARREN & WETMORE, } ARCHITECTS

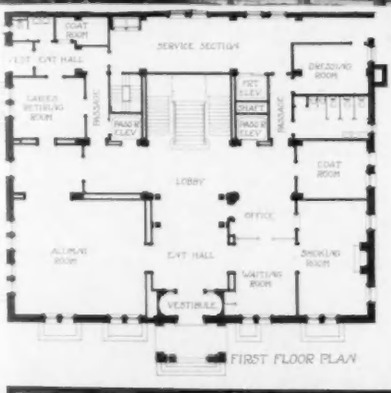


FRANK CHOUTEAU BROWN,
ARCHITECT

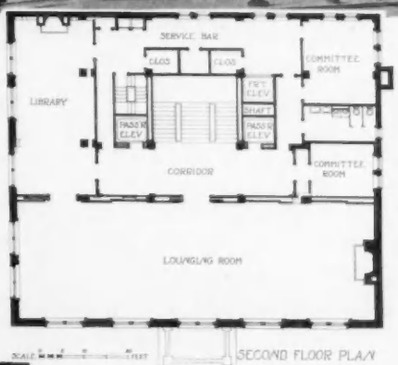




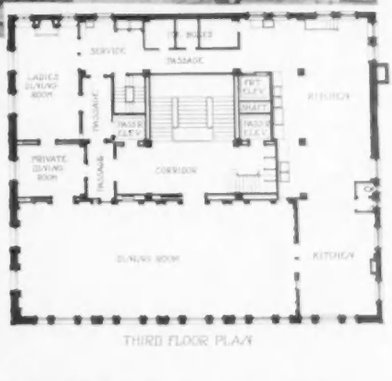
COTTAGE ON LARGE ESTATE,
LINCOLN, MASS.



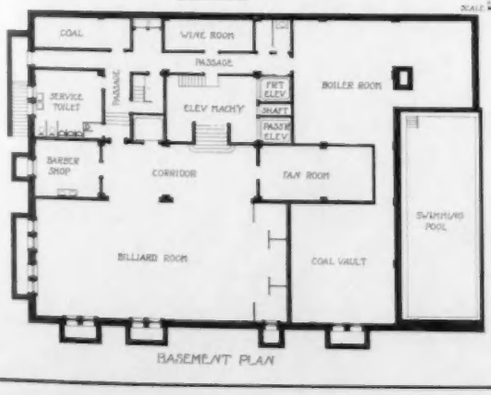
FIRST FLOOR PLAN



SECOND FLOOR PLAN



THIRD FLOOR PLAN



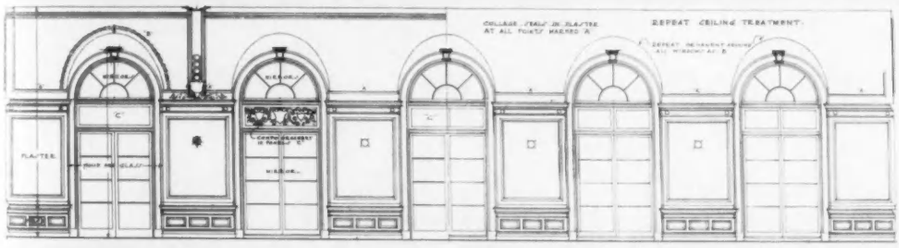
BASEMENT PLAN

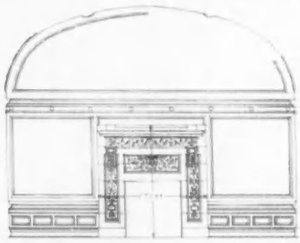
THE UNIVERSITY CLUB,
WASHINGTON, D. C.

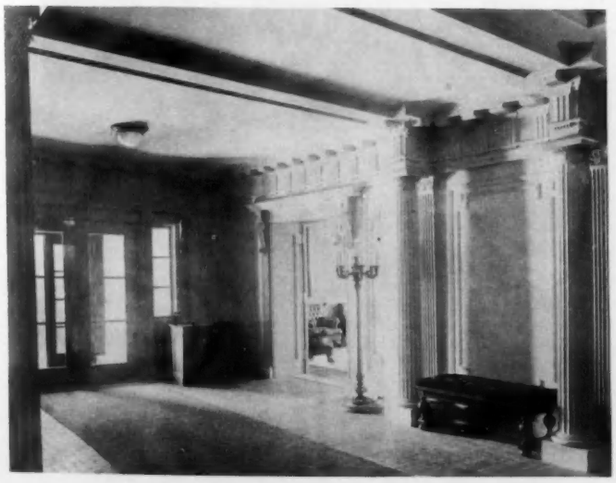
GEO. OAKLEY TOTTEN,
ARCHITECT

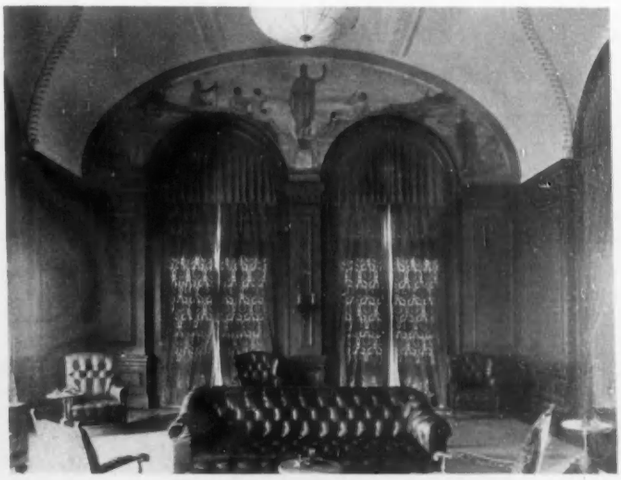
TYPICAL BED ROOM FLOOR PLAN

UofM









THE UNIVERSITY CLUB, WASHINGTON, D. C.
GEO. OAKLEY TOTTEN, ARCHITECT

SMALL OFFICE BUILDING, PHILADELPHIA, PA.
MELLOR AND MEIGS, ARCHITECTS

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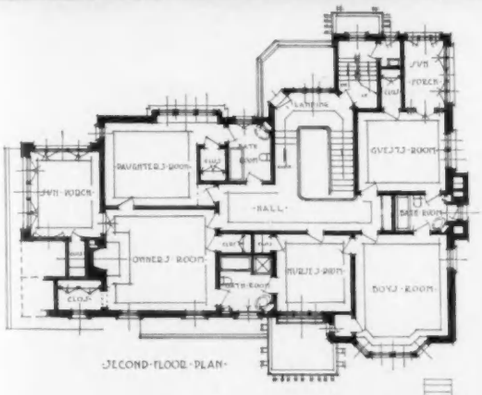
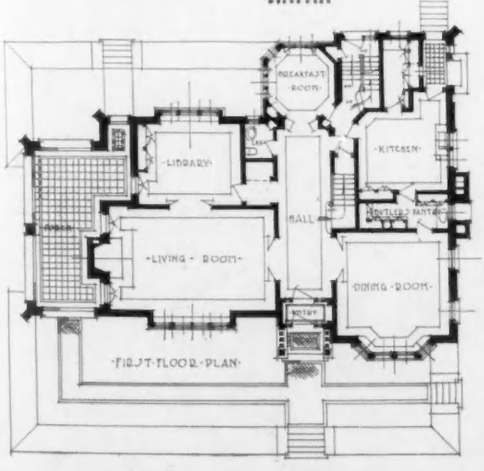




HOUSE AT CLEVELAND, OHIO
FRANK B. MEADE AND
JAMES HAMILTON, ARCHITECTS

The Unit Power Plant for Isolated Buildings and Small Groups.—Part IV.

WATER SUPPLY BY MECHANICAL MEANS.

BY CHARLES L. HUBBARD.

THIS article deals principally with systems of water supply requiring mechanical means in some form, for bringing the water from its source to the point where it is to be utilized. In addition to this, certain other matters relating to water supply, although not strictly mechanical, will be touched upon briefly in order to make the article more complete.

Quantity of Water Required. The quantity of water required will of course depend entirely upon the type and size of building or plant to be supplied. In approximating this, we will take up a few specific cases, such as dwellings, stock farms, hotels, power plants, and general fire protection.

In the case of dwelling houses and similar buildings it is customary to provide a tank or cistern holding perhaps a day's supply, and making the mechanical equipment of such capacity that it will only have to be operated a comparatively short time, say two or three hours, for providing a supply for the entire day. This gives ample leeway for any special demand, such as laundry work, etc., when the plant may be run for a longer period. In the case of an ordinary dwelling the supply may be based upon an average of about 30 gallons per day per occupant. Laundry work, lawn sprinkling, etc., must be provided for in addition to this, and may usually be cared for as noted above.

For country estates and stock farms, the above will apply to house requirements, while about 10 or 12 gallons additional should be provided for each head of stock kept upon the place. In cases of this kind, the quantity of water required for sprinkling lawns and gardens is quite an important item, and must be estimated in each particular instance according to local conditions.

This may be estimated roughly by assuming that a ¼-inch hose nozzle will discharge about 120 to 150 gallons per hour under a pressure of 30 pounds per square inch at the hydrant or sill cock. The heavy demands for water in a hotel are for baths and laundry purposes. The first of these occurs largely between the hours of seven and nine, while the requirements for domestic and laundry purposes are likely to come later in the day, to a considerable extent, and to be more evenly distributed.

In estimating for baths it is customary to count on 20 to 30 gallons per bath, and from 2 to 3 per hour during the rising period. Buildings of this kind are usually provided with storage tanks both for hot and cold water, especially when supplied from a private source, so that here, as in case of a dwelling house, the capacity of the pumping outfit will depend both upon the size of the storage tank and the proportion of the time it is desired to run the pump. As a general thing, it may be operated for a greater length of time, because there will be other machinery to care for and the same attendant may look after the pumping equipment also. If the pump has sufficient capacity to furnish the entire day's supply by six or eight hours' work, any extra demand may usually be cared for by the storage tank. If the water is supplied by a hydraulic ram, working continuously, then larger tanks should be provided, as the ram cannot be speeded up to meet any sudden demand.

In case of power plants, water is required for boiler feeding and, in some cases, condenser service also. For ordinary conditions 4 gallons per hour per boiler horsepower will be sufficient when the steam is exhausted outboard by the engines. If the steam is condensed in a heating system or surface condenser, and pumped back to the boilers, only ten per cent of the above will be required.

In case a condensing outfit is used in the summer time, in connection with reciprocating engines, 30 and 35 pounds of cooling water will be required per pound of steam condensed for jet and surface condensers, respectively. The amount of steam to be condensed per hour may be obtained from Table III given in a previous article.

In systems of fire protection, allow 250 gallons per minute for each 1⅛ inch standard fire stream, and the same amount for each fifty sprinkler heads. For industrial plants of various kinds the water requirements will vary so widely that they must be estimated from data furnished by the owners or engineers in charge.

Sources of Supply. The source of supply will depend upon the quantity required and the purpose for which it is to be used; also upon the available sources in the vicinity of the building.

For dwelling houses and country estates, natural springs, mountain brooks, deep wells, and artesian wells give the best quality of water for domestic purposes. Where the water is to be used for laundry purposes and in power and industrial plants, rivers and ponds may be added to the above sources. When large quantities are required, natural ponds and lakes, of such size as not to be seriously affected by the dry seasons, form a valuable source of supply. Running streams which never fall below the maximum requirements are also a desirable source of supply, provided they are conveniently located and the water is of fairly good quality.

The value of artificial reservoirs fed by springs and brooks depends largely upon the stability of supply, and can only be determined by looking carefully into their past history for several seasons back. By *deep wells*, are meant those which are excavated to a depth of 20 to 40 feet, with diameters ranging from 6 to 10 feet, and which serve as storage reservoirs as well as sources of supply.

When none of the above sources are available, artesian wells are often resorted to, being quite common in some parts of the country.

The capacity of a well of this kind depends largely upon various local conditions and cannot well be predicted. Data based on a 6-inch well, sunk into a water-bearing stratum 10 feet in thickness, and having the water level lowered 1 foot by continuous pumping, gives the following capacities in gallons per hour, according to the porosity of the soil. Fine sand, 170; medium sand, 1,200; coarse gravel, 3,000; fine gravel, without sand, 20,000.

These figures are much higher than are commonly

obtained in New England or other localities where the soil is more or less rocky.

There is very little to be gained by increasing the diameter of an artesian well, as the flow depends largely upon the depth which the natural water level is lowered by pumping. If more than one well is sunk, they should not be placed too near together, the distance ranging from 100 to 400 feet, according to the lowering of the water level by pumping.

Methods of Bringing Water to Building. When the source is at a sufficient elevation above the building to give the required pressure it may be best to provide the reservoir at this point and simply connect with the various fixtures by means of a gravity pipe line; the arrangement being practically the same as when connecting with a street main.

Table XI gives the gallons of water discharged per minute through pipes of different diameters for various friction heads, in pounds per square inch. To change pounds per square inch into feet head, multiply by 2.3; and to change feet head into pounds per square inch, multiply by 0.43. The friction heads in the table are for 100 feet length of run; for other distances, multiply by $\frac{D}{100}$, in which D is the total distance in feet.

TABLE XI.

Gal. per min.	Friction head in pounds per square inch for 100 feet length of run, for different sizes of pipe.									
	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	6"	8"
5	3.3	0.84	0.31	0.12	----	----	----	----	----	----
10	13.0	3.16	1.05	0.47	----	----	----	----	----	----
15	28.7	7.00	2.38	0.97	----	----	----	----	----	----
20	----	12.30	4.07	1.66	0.42	----	----	----	----	----
30	----	27.50	9.15	3.75	0.91	----	----	----	----	----
40	----	48.00	16.10	7.26	1.60	----	----	----	----	----
50	----	----	----	10.00	2.44	0.81	0.35	----	----	----
75	----	----	----	22.40	5.32	1.80	0.74	----	----	----
100	----	----	----	----	9.46	3.20	1.31	0.33	----	----
150	----	----	----	----	----	7.00	2.85	0.69	0.10	----
200	----	----	----	----	----	12.48	5.02	1.22	0.17	----
250	----	----	----	----	----	----	7.76	1.89	0.26	0.07
300	----	----	----	----	----	----	11.20	2.66	0.37	0.09
400	----	----	----	----	----	----	19.50	4.73	0.65	0.16
500	----	----	----	----	----	----	30.80	7.43	0.96	0.25

Example. The surface of a reservoir is 23 feet higher than a house tank, and the distance is 1,000 feet; how large a pipe will be required to discharge 15 gallons per minute? The friction head in pounds per square inch per 100 feet is $23 \times 0.43 \times \frac{1,000}{100} = 0.99$. Looking in Table XI, along the line for 15 gallons, we find that a 1½-inch pipe has a friction head of 0.97, which is slightly less than the available head, and is therefore of ample size. If the water contains suspended matter, the pipe should be made of such size that the velocity of flow will not fall below 2 or 3 feet per second, else sediment will collect at the low points. Galvanized steel pipe is eommonly used for sizes up to 2½ or 3 inches, and cast-iron pipe for the larger sizes, the latter material being more durable for underground work. When the source of supply is at a lower elevation than the point where it is to be used, the water must be forced into the storage tank by means of a pump, hydraulic ram, or air-lift. If a pump is used, its location will depend upon the elevation to which the water is to be raised. The height from the surface of the supply to the pump, plus the friction head in the suction pipe, reduced to feet, should not exceed 20 feet at the most, and 15 feet is safer. If the total elevation is more than this, the pump should be located near the source of supply, and the water lifted by force instead of suction. In general, a short suction pipe is better than a long one, because there is less danger of the inleakage of air; and for the same reason, wrought iron is better than cast iron on account of tighter joints.

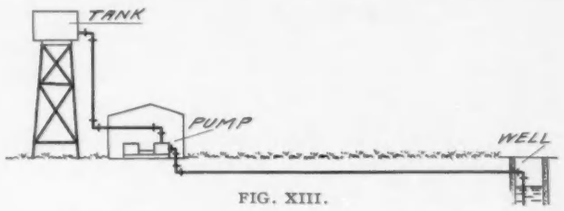


FIG. XIII.

Fig. XIII shows location of pump for lifts of less than 20 feet (including friction), and Figs. XIV and XV where the total lift is more than this. In one case (Fig. XIV), the contour is such that it is necessary to place the pump close to the source of supply, while in the other, it may be located nearer the building on account of convenience. Where a

FIG. XIV.

pump is used for forcing water through a pipe line, the proper size of pipe will be fixed by the relation between the saving in cost of pipe and the increased cost of pumping against a greater head. Under average conditions a velocity of 2 feet per second in the pipe gives about the best results.

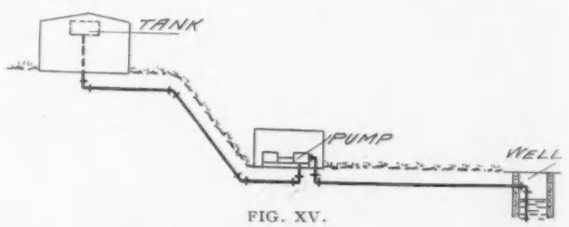


FIG. XV.

Capacity and Power of Pumps. The capacity of a piston or plunger pump is given by the formula *(d)*

$$G = \frac{A \times L \times N \times S}{230}, \text{ in which}$$

G = gallons per minute.
A = area of piston, in square inches.
L = length of stroke, in inches.
N = number of strokes per minute.
S = a factor, depending upon the leakage around piston and valves, and which may be taken as .8 for small and medium sized pumps in good condition.

When taking capacities from a catalogue, care should be taken to learn if this leakage, called "slippage," has been taken into account.

The power required for driving a pump is given by the formula, (*e*) $H.P. = \frac{G \times H}{4{,}000 \times E}$, in which

H. P. = actual horse power required.

G = gallons pumped per minute.

H = total head, in feet, including height of lift and friction head in pipe.

E = efficiency of pump, which may be taken as follows:

Triplex Power Pumps	0.6 to 0.7
Small and Medium-Sized Centrifugal Pumps	0.5 to 0.6
Deep Well Pumps	0.4 to 0.5

When computing the cost of power for small and medium-sized direct-acting steam pumps, count on 100 to 120 pounds of steam per delivered horse power.

Types of Pumps and Method of Driving. The three classes of pumps commonly used under the conditions noted above are the direct-acting steam pump; the power pump, of the simple, duplex, or triplex type, according to the number of cylinders; and the turbine or centrifugal pump.

The first of these, as its name implies, is driven by a direct-connected steam engine, the steam and water pistons being attached to the same rod. This pump is simple in construction, but wasteful in the use of steam. It has the advantage of being easily regulated, requires but little care, and is adapted to cases like that shown in Fig. XIII where it may be located in or near the boiler room. It is made in all sizes, both with single and duplex cylinders, and may be arranged to start and stop automatically by means of a float and balanced valve.

The power plunger pump is made in different forms and sizes and is driven by an independent motor of some form. This may be a steam, gasoline, or hot-air engine, an electric motor, or it may be belt-driven from a convenient counter-shaft, if one is available. This type of pump may be used under any of the conditions shown in Figs. XIII, XIV and XV. In the last two cases it might be driven either by a gasoline engine or electric motor, as most convenient. If electric current were available, the latter would probably be preferable, as the pump could be started and stopped from a distance without visiting the pump house. As a matter of fact, both motor and pump should be inspected, oiled, and cleaned every day when starting up, but may be shut down by means of a switch located in the main building.

The centrifugal pump is a type which has come into quite general use of late years and is particularly adapted to this class of work, being free from valves and requiring practically no attention. It may be driven by a steam or gasoline engine, turbine, or electric motor, as best adapted to the location and conditions under which it is operated.

Comparative Cost of Operation. The writer recently worked out in considerable detail a series of six problems to determine the comparative cost of pumping water by different methods. These problems, however, relate to a large power plant, requiring a total of 1,800 gallons per minute, for sixteen hours a day the year round. Where steam and electricity are required in these cases they are taken from the main plant and charged up at cost. The figures representing the cost of operation are for a year, and include fuel charges and interest and depreciation on first cost of plant. This, of course, calls for a much larger equipment than is included within the scope of the present article, and the figures will only hold for the conditions actually assumed, but the *relative* costs of the different methods would probably not vary greatly if worked out on a smaller scale. The equipment and costs are as follows:

1. Simple direct-acting duplex pump	$5,000
2. Compound direct-acting duplex pump	3,800
3. Engine driven triplex pump	3,800
4. Motor driven triplex pump	2,500
5. Motor driven centrifugal pump	2,000
6. Steam turbine driven centrifugal pump	3,300

In comparing these results it should be borne in mind that the low cost of pumping by electricity is due to the fact that the current is generated on the premises. If it were purchased at usual rates from a central station, it would, in most cases, be considerably more.

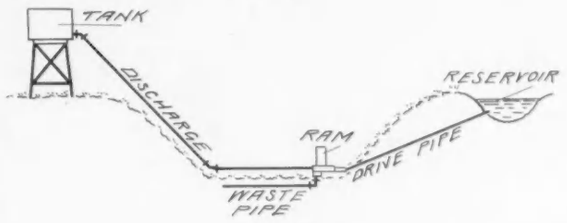


FIG. XVI.

Hydraulic Rams. Hydraulic rams are used where there is a sufficient water supply and suitable grades. It is the cheapest method of pumping water, as there is practically no expense for power. They require a minimum of attention and will last for years. The usual method of connecting a ram is shown in Fig. XVI. In practice it is customary to make the length of the drive pipe equal approximately the height of lift from the ram to tank or reservoir. When it is necessary to locate the ram at a greater distance from the source of supply, a standpipe is introduced to shorten the length of the drive pipe. For large quantities of water the fall from source to ram should not be less than 2 feet, and should not, in general, exceed 12 or 15 feet.

The working formulas for the hydraulic ram are given below.

$$(f)\quad g = \frac{2 \times G \times H}{3 \times h},\ (g)\ G = \frac{3 \times h \times g}{2 \times H},$$

$$(h)\quad H = \frac{3 \times h \times g}{2 \times G},\ (i)\quad h = \frac{2 \times G \times H}{3 \times g},$$

in which

g = gallons discharged by ram.

G = gallons required for operating ram, including g.

H = fall from source of supply to ram.

h = height to which water is lifted above ram, including friction head.

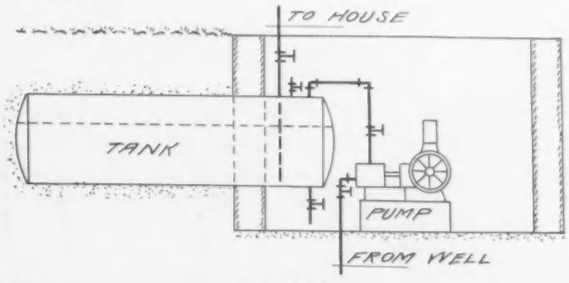


FIG. XVII.

Hydraulic rams are built in all sizes, from those adapted to dwelling house work up to plants for supplying large towns.

Pneumatic Systems. As commonly spoken of, a pneumatic system of water supply means the substitution of a closed tank, either sunken or located in the basement, for the elevated tank or reservoir. A common arrangement is that shown in Fig. XVII, the storage tank being buried in the ground beside the building, with the end projecting into the basement in order to give easy access. In small plants the entire equipment is usually placed in the basement.

The pressure pump for filling the tank may be operated by hand, or by an electric motor or gasoline engine in case of the larger sizes. In using this arrangement, the tank is first allowed to fill with air under atmospheric pressure. The vent is then closed, and the water pumped in, which, as the tank fills, compresses the air and causes a pressure. Table XII shows the pressure in the tank with different quantities of water when filled in this way.

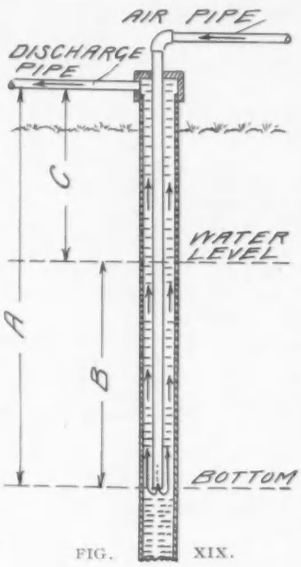


FIG. XIX.

TABLE XII.

Volume of Water in Tank.	Pressure per Square Inch.	Volume of Water in Tank.	Pressure per Square Inch.
1/4 full	5 lbs.	5/8 full	25 lbs.
2/5 ,,	10 ,,	7/10 ,,	30 ,,
1/2 ,,	15 ,,	3/4 ,,	45 ,,
3/5 ,,	20 ,,	4/5 ,,	60 ,,

When it is desirable to carry a higher pressure for a given volume of water, a certain amount of air may be forced in when filling the tank by means of a special valve attached to the pump. The principal advantage of a system of this kind is its compactness and the ability to place the tank under ground or in a basement where there is no danger of freezing. Another pneumatic system, adapted to deep wells, is shown in Fig. XVIII. This consists of an engine or motor, compressor, air reservoir, and pneumatic pump which is placed at the bottom of the well.

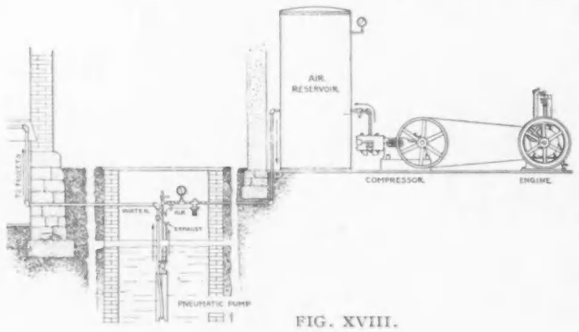


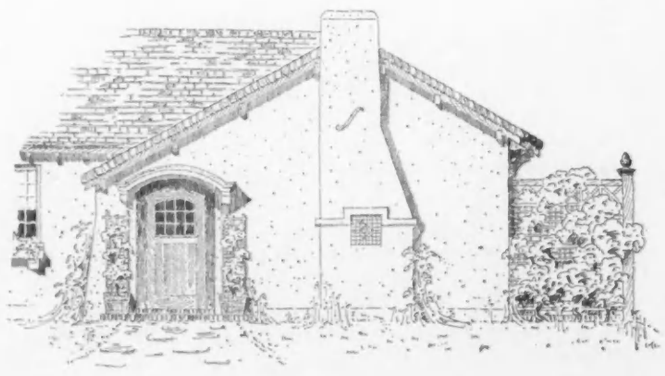
FIG. XVIII.

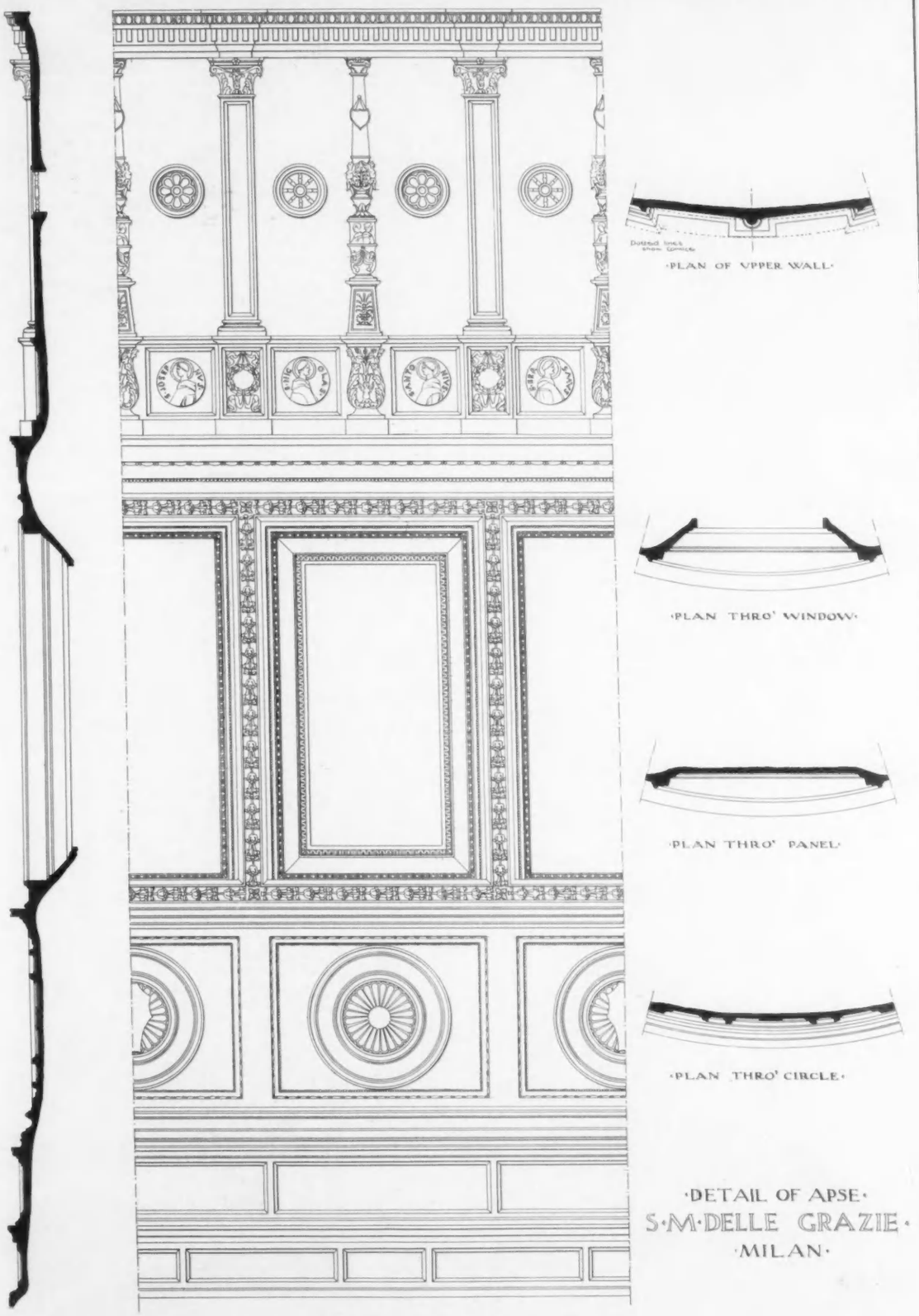
In operation, the reservoir is charged with compressed air, which operates the pump, and is only used when water is drawn from the faucets. An even pressure is maintained on the system by means of a regulating valve, and the compressor need only be used when recharging the reservoir.

The *air-lift*, so called, is a pneumatic pump especially adapted to raising water from artesian wells. The compressing outfit is practically the same as in the system just described, while the lifting device is shown in Fig. XIX, and consists simply of a pipe carried down inside the well tubing for delivering compressed air near the bottom. The effect of this is to force successive "slugs" of water up the tube and into the discharge pipe leading to the tank.

The height "A" is called the total head, "B" the distance from the bottom of the air pipe to the water level in the well, and "C" the distance from the water level to the discharge outlet. In practice the ratio $\frac{B}{C}$ runs from 1.5 to 2.5 and should never be less than 1.5 if possible. For the best results, the area of the air pipe should be about one-sixth that of the water pipe under average conditions.

While this is a very simple method of raising water from artesian wells, it is more expensive than using the regular form of plunger pump on account of the cost of compressing the air for operating it.

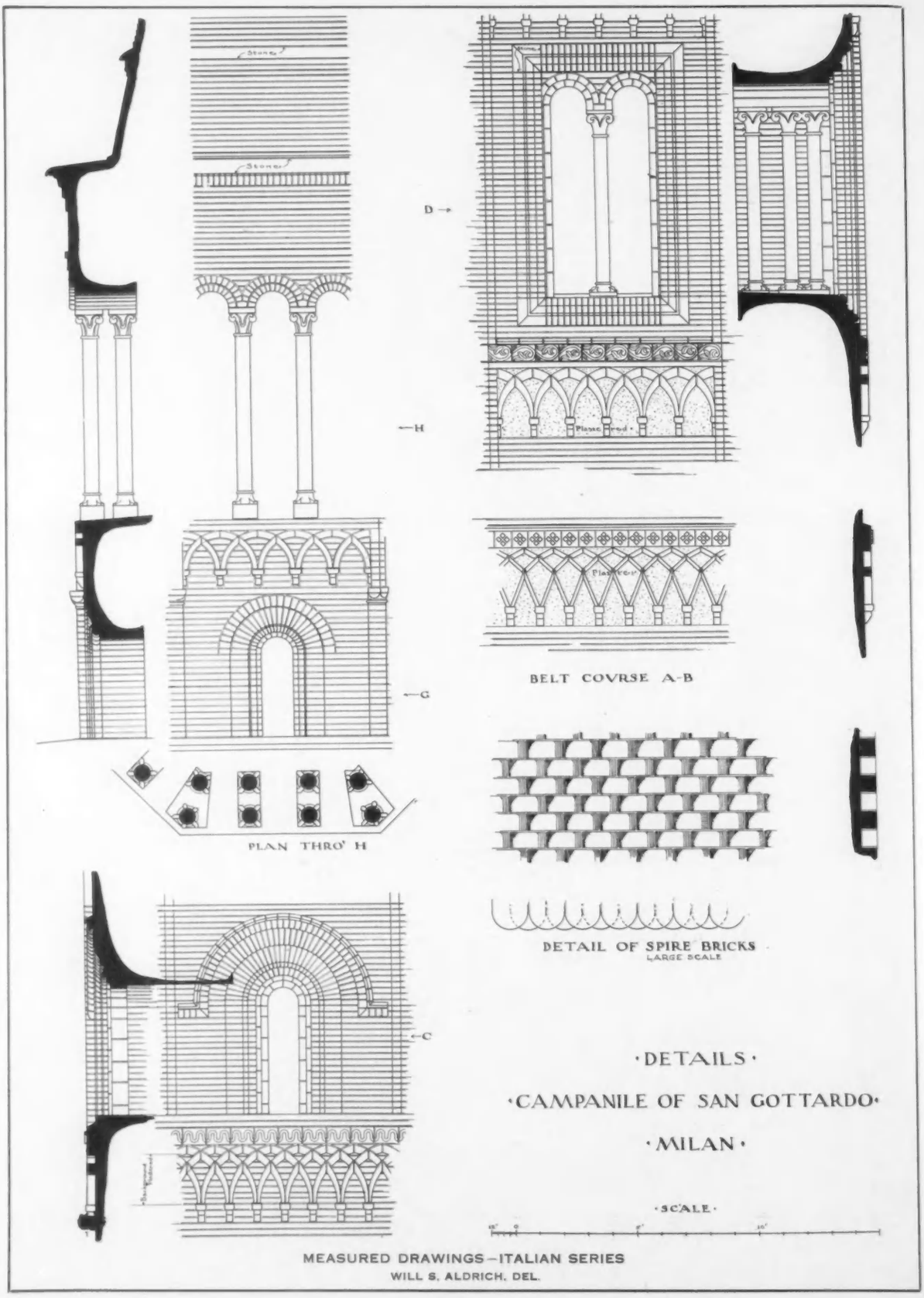




DETAIL OF APSE
S·M·DELLE GRAZIE
MILAN

MEASURED DRAWINGS—ITALIAN SERIES

WILL S. ALDRICH, DEL


D
H
G
C
PLAN THRO' H
BELT COVRSE A-B
DETAIL OF SPIRE BRICKS
LARGE SCALE
·DETAILS·
·CAMPANILE OF SAN GOTTARDO·
·MILAN·
·SCALE·
MEASURED DRAWINGS—ITALIAN SERIES
WILL S. ALDRICH, DEL.

The Croisic Building, New York City.

FIFTH AVENUE AND TWENTY-SIXTH STREET.

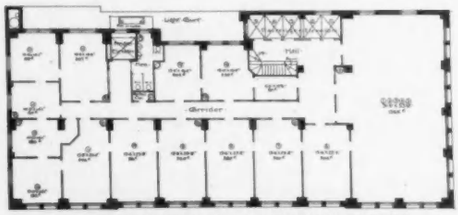
BROWNE & ALMIROTY, ARCHITECTS.

THIS building is one of the late additions to the tremendous number of tall loft buildings in New York City. It constitutes an excellent evidence of the general improvement in commercial architectural design, and demonstrates that owners of this type of building feel it necessary to build so well designed a building to attract the best class of clients. It is not of course such a notable contribution to tall building architecture as the Bankers Trust Building and other down-town structures, but of its type and for its purposes is excellent.

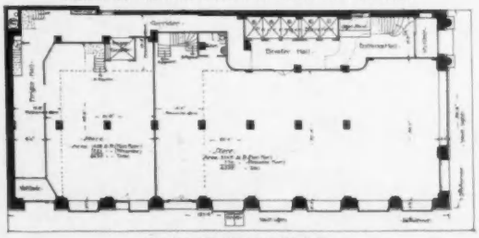
The biggest feature of New York construction for the past few years has been the erection of a really great number of loft buildings, ranging from twelve to twenty-five stories in height, constructed mostly on the side streets within a block on either side of Fifth avenue, and in many cases upon Fifth avenue itself.

This particular building, which occupies the corner of 26th street and Fifth avenue, is in a most excellent location, suited only to a high grade of tenants who are coming more and more to demand a suitable architectural expression of the needs and purposes of the buildings which they occupy.

With the increasing number of these loft buildings, especially in narrow streets, their designers are learning to exercise a little restraint in the matter of design out of consideration for their neighbors, and are endeavoring as far as possible to suppress heavy projections which tend materially to decrease the light area. This suppression of the cornices naturally involves the exclusion of Classic detail and the omission of Classic orders, and since horizontal treatment of the building is eliminated from the possibilities, the vertical design which we associate with Gothic has oftentimes taken its place.



PLAN OF NINTH AND FIFTEENTH FLOORS.



PLAN OF FIRST FLOOR.

THE CROISIC BUILDING, NEW YORK CITY.
Browne & Almiroty, Architects.

The greatest difficulty with the use of a Gothic or semi-Gothic treament of the vertical lines is the upper termination of the building in a manner which shall be reasonably economical, both of cost and space, and perhaps a genuine solution of this problem has not yet been found; certainly none of the loft buildings with flat roofs have been entirely successful. The attempt to justify the strong vertical lines by means of finials rising above the coping wall has not been satisfactorily dealt with in any case that comes to mind. Where a treatment which is from an artistic point of view successful, that of a rather steep roof forming a background to the terminations of these lines, has been used, as in the West street Building, the Woolworth Building, and this Croisic Building, among others, it can be imagined that the rental value of the stories in this roof is comparatively small. A similar type of roof in the Bankers Trust Building was very happily utilized for storage purposes, and, as in most tall buildings, basements are so terrifically expensive, it would seem that the storage space in the upper floors may be in the end more economical than in any story below the street. On the other hand, rental values of top floors, especially when fully lighted by skylight, are far in excess of any other floor (except the street floor), and economically the peaked roof cannot be justified, although artistically it appears to be the only satisfactory method yet devised.

The Croisic Building presents very few features of marked difference from the typical loft building, except that it is for the most part rather better designed, and is exceedingly well executed. It is a satisfaction to note that the owners were willing to give space enough to piers on the ground floor so that some reasonable amount of stability in appearance is possible. While the designers of this building have not attempted to carry their vertical lines distinctly to the ground, the difference in material between the two lower floors and the shaft of the building is not so great that the feeling that the vertical lines spring from the ground has been lost. The base is of granite, the shaft of a good quality of rough brick, and the crowning motives of well designed terra cotta, with the large openings filled in with iron.

The growing use of terra cotta for structures of this character is interesting and noteworthy, and with the development of the vertical line has constantly increased. Cornices of wide projection, such as that of the Gorham Building, New York City, could not of course be sensibly constructed in the small pieces possible to this material, and for a good many years, especially in the cheaper buildings, galvanized iron or copper cornices were almost universal. With the tendency to omit the cornices, or to reduce them to mere bands at the termination of the structures, the amount of terra cotta used naturally increased. This is true especially in such a structure as the Croisic Building where the details of the ornament are

frankly copied from old Gothic work and a great number of repetitions of the same motive are required. Terra cotta is almost the inevitable material, especially since the Gothic ornament is rather complex and difficult to cut.

The old question as to whether terra cotta used to imitate stone forms is a justifiable expedient has been raised

ELEVATOR GRILLS.

in the case of this building as in others, but when the uses of all building materials from the earliest days to the present time have been so frankly imitated from each other, until we begin to criticize the Egyptians for cutting and painting their stone columns to imitate bundles of reeds tied together, this question might better be left unsettled.

THE
CROISIC BUILDING,

NEW YORK CITY.

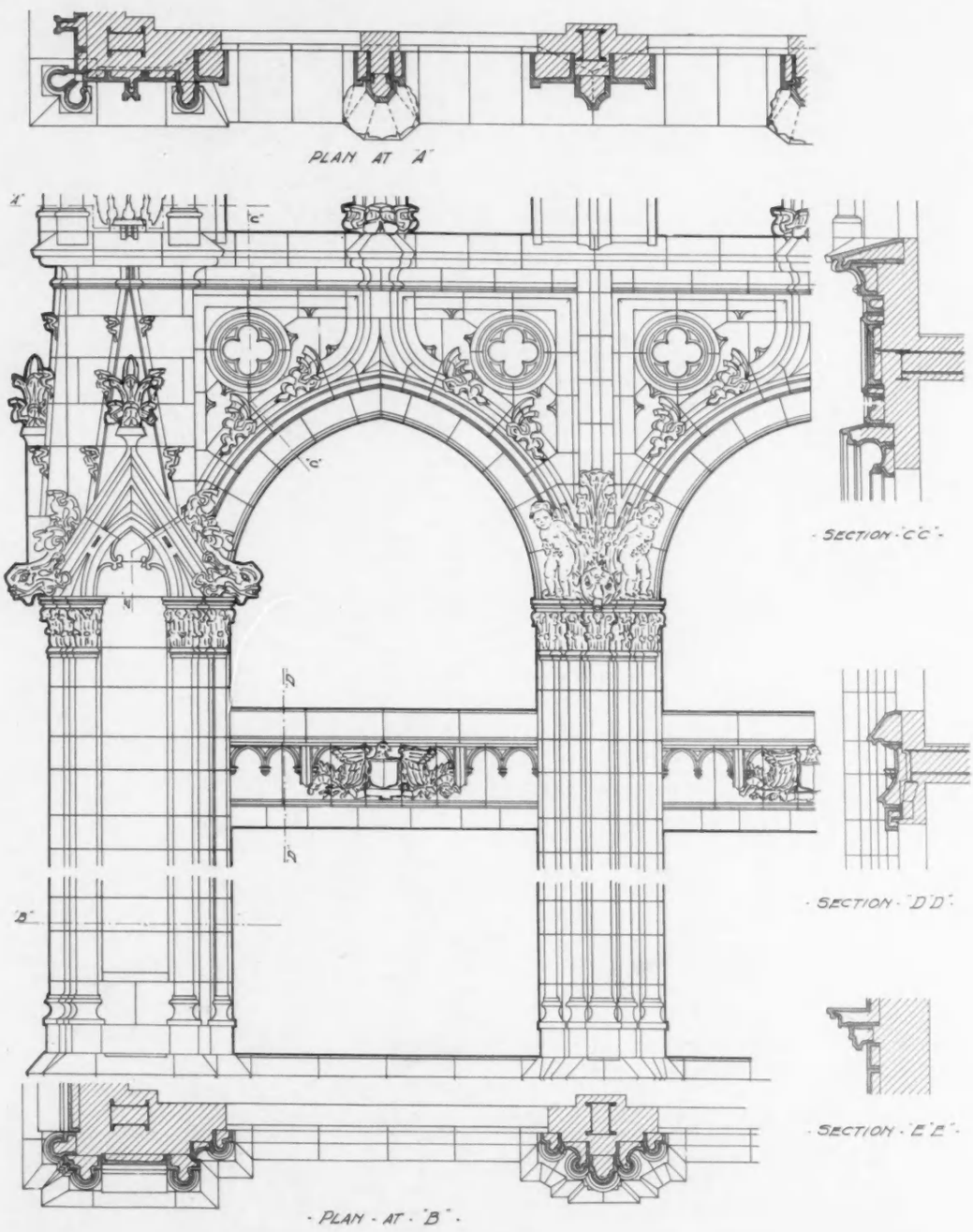
Architecture of today in the high building has been resolved almost into a question of an applied decorative treatment of a fireproofing covering to a steel structure, and it seems that any material, or combination of materials, which satisfies the eye as to the inherent beauty of the design, and has besides a certain comforting sense of

STAIRWAY DETAIL.

stability, is good legitimate work. It is impossible to forget that any tall building is a steel structure, veneered with a mighty thin shell of masonry, and it is only when an architect consciously attempts to make this veneering heavy enough so that if it were solid it would take the place of the steel which it encloses, that we feel an incongruity.

Browne
&
Almiroty,

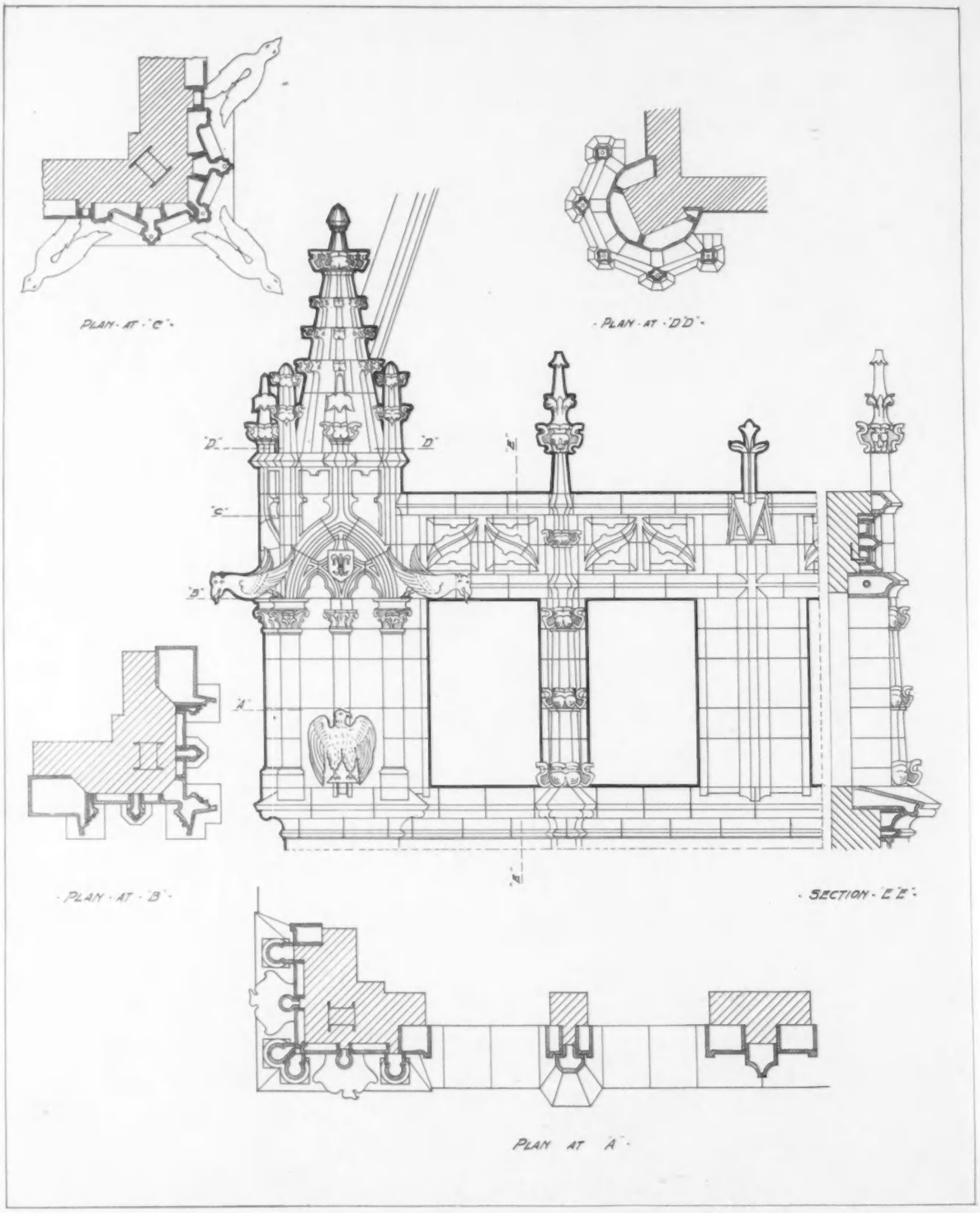
Architects.



TERRA COTTA DETAILS

THE CROISIC BUILDING, NEW YORK CITY

BROWNE & ALMIROTY, ARCHITECTS.



TERRA COTTA DETAILS

THE CROISIC BUILDING, NEW YORK CITY

BROWNE & ALMIROTY, ARCHITECTS

An Architects' Fees.

A LETTER FROM R. CLIPSTON STURGIS.

Editor of THE BRICKBUILDER:

I have been much interested in your editorials on the subject of various methods of charging for professional services by architects. As I have had no work which I have charged for on a percentage basis for over five years, but have used successfully a scheme of charging a professional fee plus twice the cost of drafting, which is one of the methods discussed in your editorials, I feel that perhaps my actual experience may help to make clear, and perhaps establish, a system which appears fair, business-like, and professional. The editorials in your January, February, and March issues refer to four different schemes:

1. Percentage basis — being a fixed percentage of the final cost of the building.
2. A method by which the charge is made a multiple of the total cost of drafting.
3. A method by which a specific charge is made for a professional fee, to which is added a certain multiple of the cost of drafting.
4. A method by which a specific charge is made for professional fee, a specific charge made for the general office expense, with the actual cost of drafting added.

Of these four the first is the traditional method, and so far as I know everybody agrees that it is an entirely illogical method, its use being justified solely by the fact that it approximates a reasonable charge, and averages up a fair return to the architect in the long run. It is a method which makes the good client, who ought to get bargain rates, give the architect a larger professional fee, in the matter of net profit, in order to even up on the architect's books for clients who, by the nature of their work, and the nature of their own personal exactions, cost the architect more, and so reduce the balance that is left for his profit.

The second scheme makes the architect's professional fee dependent upon the amount of drafting which is entailed in the work, and there is no relation between these two factors which makes such a charge logical.

The fourth method charges a fixed sum for general office expenses, to be based, according to the article, upon the cost of the work. This appears to me to be probably the outcome of theory rather than experience. It seems to me that the amount of general office expense, apart from drafting, that should be charged to any particular job depends more on the length of time that the work is in the office and the amount of draftsmen's services required, than on the cost of the building. It represents the cost of maintaining the draftsman at his table, and it will continue as a charge against the particular work as long as the draftsman is engaged upon it. If the suggested system were applied to the three examples given below, I think that it would be clear that it is not a logical arrangement.

The third method is the one I have employed for several years, and on which I think some further information will be of interest. This method, then, to repeat, is one involving the charging of a professional fee for the architect's personal, professional service, to which is added a charge covering the personal expenses of the architect in carrying the work through in his office; this being determined to be twice the actual cost of the drafting entailed in the work.

In the articles under consideration it is stated that the fee is "determined in proportion to the cost." This, as far as my office is concerned, is but a half-truth, a quarter-truth one might say. The cost of the work is one determining factor, its character another, the length of time to complete the work a third, and, in some ways, the most important. To take an example: Three pieces of work, each to cost $100,000; one a private house, one an office building, one a factory. The first will require the personal service of the architect throughout, the plans, the exterior, the interior, shop and studio superintendence, and oversight on the building; the second will require similar service for the plan, the exterior, and a small amount of the other personal service; the third will require the study of plan requirements and some suggestions to a good draftsman and little more. Roughly speaking, the first will take two years, the second will take a year and a half, the third a year. The professional fee would be in the form of an annual salary; a proportion, not the full proportion, payable monthly, the balance on completion. If $3,000 is a reasonable fee for the year's service on the factory, $6,000 is not unreasonable for the two years' service on the house. Perhaps both these are unreasonable, but my point is that the fee should be fixed after consideration of cost and character of the work and length of the service required. It is a very simple thing to fix this at a sum that the owner will accept as reasonable, for he is used to salaries and is used to professional fees. The agreement between architect and owner should define the service contemplated, and as time is an essential part of this agreement it will run for a definite time and therefore involve a fixed sum with provision for extension if the work is prolonged. So much for the fee.

The charge for drafting, that is, the actual cost of draftsmen's salaries engaged on the work, is doubled to cover other miscellaneous expenses, such as rent, heat, light, stenography, etc. This is done largely because of its convenience in book-keeping, as experience has shown that, roughly speaking, the total of draftsmen's salaries represents very closely the total of the other office expenses.

Another method which is perhaps in some ways more logical is to pro-rate the other office expenses among the clients in proportion to the *time* of the draftsmen spent on the work, instead of to the *cost* of the salaries of the draftsmen engaged on the work. The $10 man occupies the same space, uses about the same amount of material, and costs the architect to maintain in rent, light, etc., as much as the $60 man. On this basis, if a client has occupied forty-five per cent of the time of a draftsman during a month he would bear forty-five per cent of the office expense of that month. This means more calculation, is

perhaps no more absolutely accurate than the other method, and I believe that the owner prefers the simpler method of doubling the drafting charge. The above does not of course cover such miscellaneous additional charges as travel, telegrams, long distance telephone calls, models, and other incidentals, representing definite outlay for a particular work, which are charged in addition to the above.

In the last article a point was made that is significant to my mind of a very general error. Much is often said of the large amounts paid in commissions to the architects. In this article stress is laid on the fact that a fault in the system I have endorsed above is that the owner must rely on the architect not to employ overpaid or needlessly expensive draftsmen in the work so as to increase the amount obtained to cover the office expense. How much does an owner know of how the architect spends the large amounts of money involved in the building itself; of the desirability of one material or type of construction over another; of whether the roof could be made exactly as efficient with a much cheaper construction which would also involve less repair charges in the future; of the relative costs of interior marbles selected, to others of similar effect; of the saving that could be made on his building by changing from eight cut granite to four cut, or from honed limestone to machine planed. How often does it occur to an owner to question on these points and determine in his own mind where he prefers to spend his money. Does he not generally rely on his architect for proper advice on such points? He generally does and certainly should. With all these opportunities, therefore, of making the work cost more or less by an amount that may easily exceed the architects' total commissions, any lack of confidence in the architects' judgment and good faith in the relatively small matter of draftsman's wages and share of office expense seem almost absurd. It is enough to start with the frank statement that "twice the drafting" is a *reasonably close approximation* to a fair charge for all office expenses, not including of course incidentals of travel, telegraph, etc., and any error there may be, is too small to worry about whichever side of the ledger it may be on. This slight question can well be overlooked after we have eliminated the vastly greater factor of uneasiness to all concerned, and that is the dependence of the architect's commission on the cost of material he decides to advise the owner to use, as in the case of the established percentage basis. An owner who has trusted his architect on that basis can surely have no objections to trusting him on the basis of a fixed professional fee plus twice the drafting.

A practical example may perhaps be of service to show just how the system works, and how readily it adjusts itself to and takes care of this vexed question of expert service. As the architect is paid for his own service as a thing by itself and the owner pays the cost of everything else, it is evident that he pays for any and all expert service; the civil engineer sends in his bill for surveys or borings, the structural and domestic engineers are employed if their services are to the advantage of the owner and he pays just the cost. There is then no question as to whether or no the owner is paying two commissions on the heating, as there is when he pays six per cent to the architect, and again six per cent to the domestic engineer. The agreement between the architect and the owner rehearses all that the architect undertakes, what he is to receive for it, and what the other charges which the owner must pay will approximately amount to. As some factors in the agreement may be doubtful, the agreement may contain provision for extension of time and increase in the sum named; but if the owner desires a fixed outside limit and the work is straightforward, it is possible, but always hazardous, to make a fixed agreement. In this case it would naturally be a somewhat higher figure to cover just that risk.

The following is an outline form of agreement which I am now using and which I suggest as covering the various items necessary in an agreement between architect and owner for work done on this basis.

R. Clipston Sturgis.

Form of Agreement

BETWEEN ARCHITECT AND OWNER.

Agreement made_____between_____ _____owner on the one part and_____architect of_____on the other part.

_____(date)_____

(1) The Work Contemplated. The work for which the architect is to render professional services under this agreement consists of the planning and construction of a _____at_____, estimated by the architect at this time to cost about_____ _____($), with an additional_____($) for furniture. This agreement, however, will not be affected by any change in these amounts.

(2) Scope of Professional Service to be Rendered.

(*a*) The architect shall render complete professional services; consisting of such conferences, preliminary studies, working drawings, specifications, large scale and full size detail drawings as may be necessary, together with the supervision of the letting of all contracts and the general direction and supervision of the work, including purchase of furniture. The charges noted below under "Architect's Salary" are for the personal professional service of_____(the architect)_____. The expense of drafting, engineers, incidentals, and superintendence will be paid by the owner in addition to such salary, as noted below under "Additional Charges."

(*b*) The architect shall provide five blue prints of each scale drawing and the original of each full size drawing.

Any additional blue prints needed for the purpose of bidding on the work shall be charged at cost under "Incidentals" noted below. Any further additional copies needed on the work will be charged to the contractor. The architect shall provide one set of copies of the contract drawings for the owner when the contract is let, and another set mounted on cloth corrected to embody all changes made during construction, at the completion of the work.

The architect will furnish ten typewritten copies of the specifications, or copy for the printer, if printed.

(*c*) The architect shall in person and by representatives give such superintendence to the work during construction as may be required to insure the work being executed in general conformity with the plans and specifications, and such further instructions as may be given from time to time. This superintendence cannot prevent poor workmanship or the use of poor materials, but can require the making good of such defects as appear in the work, so far as practicable. Complete supervision can be obtained only by the employment of a clerk of the works, which is provided for as noted below (4) (*d*).

(3) ARCHITECT'S SALARY. (*a*) If the work as contemplated at this time is carried on steadily to completion it is estimated that the architect's services will terminate in_____months. On this basis the architect shall receive a total salary of_____dollars ($). This amount shall be paid as follows, $_____ a month for _____ months, with the final balance of $_____ to be paid on the issuance of the final certificate to the contractor.

(*b*) If for reasons beyond the control of the architect the work is delayed so as to extend over a period materially in excess of that contemplated as noted above, and so as to entail additional service on his part, then the total amount of the architect's salary shall be increased by an amount to be mutually agreed upon by the owner and architect.

(*c*) The owner may at any time abandon or suspend the work and the employment of the architect shall thereupon terminate if the work is abandoned, and be suspended if the work is suspended.

(*d*) If the undertaking is abandoned and the employment of the architect consequently terminated, he shall be paid in addition to his salary to the date of such termination such proportion of the unpaid balance due at completion as shall be mutually agreed upon by the owner and architect.

(*e*) If the work is suspended at any time so as to suspend also the work of the architect, the owner shall be at liberty to suspend payments on the architect's salary until his work is resumed, without affecting otherwise the terms of this agreement.

(4) ADDITIONAL CHARGES. In addition to the architect's salary determined above, there will be the following additional items of expense to be paid by the owner through the architect:

(*a*) *Drafting*. Strict account shall be kept by the architect of the cost of the drafting, such cost to be the total of the salaries paid to draftsmen engaged on the drawings, including time spent in writing specifications, but no charge is to be made for time so spent by the architect, and all expenses of stenographic work on specifications or otherwise, done in the architect's office, are to be considered as "a regular office expense." No charge shall be made for superintendence on the part of the architect.

The total amount of such drafting expense shall be multiplied by two to cover the proportionate share of "regular office expenses," and this resulting amount shall be paid monthly on statements in detail from the architect. The total expense under this item is estimated at $_____.

(*b*) *Engineers*. The services of structural, domestic, and sanitary engineers shall be paid for through the architect at cost. The total expense under this item is estimated at $_____.

(*c*) *Incidentals*. Incidental expenses in connection with the work, such as additional blue-printing, traveling expenses, models, long distance telephone, telegraph, express and other miscellaneous charges, including printing of specifications, shall be paid at cost on monthly statements from the architect. The total expense under this item is estimated at $_____.

(*d*) *Clerk of the Works*. The service of a clerk of the works will be required, and will be paid for by the owner through the architect at cost. The total expense under this item is estimated at $_____. He shall represent the interests of the owner and shall report each week to the owner through the architect.

The above charges shall be paid monthly as they are incurred on detailed statements from the architect.

(5) PAYMENTS. The above estimates are summarized as follows:

(*a*) *Salary* _____ $_____

(*b*) *Additional Charges*—

Drafting	$_____	
Engineers	$_____	
Incidentals	$_____	
Clerk of the works	$_____	$_____
		$_____

(6) NOTE. The estimated costs of the items under section (4), "Additional Charges," are understood to be approximate estimates and the final costs under these items will vary from the amounts given, depending upon conditions developing during the progress of the work, and the architect does not guarantee the accuracy of these estimates.

_____

_____

EDITORIAL COMMENT AND NOTES FOR THE MONTH

PLATE DESCRIPTION.

THE CHURCH OF THE ASCENSION, ITALIAN, NEW YORK CITY. PLATES 65, 66, 67, and 68. The Presbyterian Church in New York City for some years has taken into its membership and work the Italian element as found on the upper east side of New York City. In order to interest and hold these people it seemed necessary to provide places of worship that would at once be suitable for the practical requirements of a semi-settlement work and appeal to the esthetic taste and religious impulse of the Italian people.

In the Church of the Ascension the endeavor has been made to give the building architecturally a distinct idiomatic Italian feeling, — to design a building such as these people might find in their own home towns. The architectural problem further involved the placing of a parish house above an auditorium and providing abundance of light for both, and also preserving to the façade of the building a dominance of the ecclesiastical note inherited by these warm, emotional people from their Roman traditions derived from their old Basilicas.

Both the façade and the interior of the auditorium have been treated in stucco overlaying brick and in such fashion as to give the feeling in many places of the stucco having worn off of the underbrick surface in spots. The brick used is deep red, of fairly rough texture, and with stucco and tile inserts forms a wainscot around the entire interior of the auditorium. The stucco is colored to a soft light reddish tone to harmonize with the general feeling of the brickwork.

The auditorium is entirely lighted by day through the skylight over the dome and is ventilated by louvre windows in this dome and by a very complete system of artificial air exhaust and supply.

Meetings other than the regular religious services are provided for in the large basement room, special care having been taken in the artificial ventilation of this room.

Kindergarten work is carried on in the second story directly over the front of the auditorium by the Kindergarten Association of New York City, and for the present the roof over the remainder of the auditorium is used as a roof garden, being paved with tile and guarded by high wire fences.

Three means of escape in case of fire have been provided for the kindergarten children in two interior fireproof stairways and exterior iron stairways leading to the adjacent roof.

The cost of the building, exclusive of decoration, furnishings, etc., was approximately $42,000, or a cubic cost of $18 9/10; — the vertical heights for the cube being taken from the basement floor to the mean height of the roofs.

THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA. PLATES 72, 73, 74, and 75. A fourteen-story structure with basement and two sub-basements. Built of pink granite and limestone up to the third story. The shaft of the building is constructed of red brick laid up in Flemish bond. Terra-cotta ornamentations crown the upper stories.

The building is fireproof throughout. All doors and trim are built of non-burnable materials. A fire tower is provided at the southwest corner running the entire height of building and opening directly upon the street.

The café and entrance foyer occupy the ground floor. The second floor, a double story, is occupied by the restaurant. The kitchen is located on the floor above. The position of the kitchen floor between the main restaurant and supper floors is intended to facilitate service and to combine a light and well-ventilated workroom.

There are three supper rooms with an anteroom on the fourth floor. The ball room is on the next level. This room also extends through two stories.

There are forty-nine suites located in the stories above. Each bedroom has an adjoining bath. Two parlors are provided for each floor.

UNIVERSITY CLUB, WASHINGTON, D. C. PLATES 77, 78. Designed in the early Italian Renaissance style, at once simple and dignified. The building is 86 by 72 feet, with an 18-foot garden along the entire northern side to provide for light and air. The first two stories of the exterior are of gray limestone, heavily rusticated, while the upper stories are constructed of brick, matching in color as nearly as possible the stonework of the lower stories. A heavy projecting cornice, richly painted in colors, crowns the building.

The main entrance hall has a tiled floor, with the walls treated in ornamental Caen stone. The ladies' entrance has adjacent to it a ladies' reception room and coat room, together with a private elevator to the ladies' dining room on the floor above. In the rear of the first floor is a service entrance.

The main staircase leads to the second or main club floor. On this floor is the principal lounging room, extending across the entire front of the building, two stories in height. The ceiling is richly vaulted, the walls paneled and decorated in colors. The library, the bar, committee rooms and toilet rooms are also on this floor.

The main dining room is on the third floor. It is paneled in chestnut with ceiling beams and cornice in plaster. A unique feature of this room is the long row of windows, making the side one line of light. The main staircase extends up to this floor, but above this point a secondary staircase leads to the two bedroom floors.

There are fifteen bedrooms, six private baths, and one general bath and toilet room on each floor. On each of these floors is also a trunk room.

Ample provision is made in the basement for billiards and a barber shop, ventilating apparatus, boiler rooms, etc.